

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2016-0013

WASTE DISCHARGE REQUIREMENTS
FOR
COUNTY OF SACRAMENTO
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING
KIEFER LANDFILL, CLASS III LANDFILLS
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SACRAMENTO COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. The County of Sacramento, Municipal Services Agency, Department of Waste Management and Recycling (hereafter Discharger) owns and operates the Kiefer Landfill (facility). The facility is at the intersection of Grant Line Road and Kiefer Boulevard, in the eastern portion of Sacramento County, about 15 miles east of the City of Sacramento, one mile north of Sloughouse, and six miles northwest of the City of Rancho Murieta, in Sections 22, 26, 27, 34, and 35, T8N, R7E, MDB&M, as shown on Attachment A. The facility is a Class III municipal solid waste (MSW) landfill regulated under authority given in Water Code section 13000 et seq.; California Code of Regulations, title 27 (Title 27), section 20005 et seq.; and 40 Code of Federal Regulations section 258 (a.k.a, Subtitle D) in accordance with State Water Resources Control Board (State Water Board) Resolution 93-62.
2. The following documents are attached to this Order and hereby incorporated into and made a part of this Order by reference:
 - a. Attachment A – Site Location Map
 - b. Attachment B – Site Plan
 - c. Attachment C – Ancillary Facilities
 - d. Attachment D1 – Monitoring Network – Northeast Area
 - e. Attachment D2 – Monitoring Network – Southwest Area
 - f. Attachment E – Landfill Gas Collection System
 - g. Information Sheet
 - h. December 2015 Standard Provisions And Reporting Requirements
3. Kiefer Landfill's property boundary encompasses 1,084 acres at 12701 Kiefer Blvd, Sacramento County. The total permitted landfill footprint of 660 acres consists of 225-acre Landfill Unit 1 and 435-acre Landfill Unit 2, as shown on Attachment B. Landfill Unit 1 includes the 158.8-acre, unlined Module M-1 and the 65.7-acre, lined Module M-1L. Landfill Unit 2 includes lined Modules M-2 through M-11, of which Module M-2

and M-3 are constructed. The Assessor's Parcel Numbers are APNs 126-090-16, 17, 18, 19, 20, and 21; and APN 126-090-02 (Landfill Units 1 and 2).

4. On 22 September 2015, the Discharger submitted an amended Report of Waste Discharge (ROWD) as part of the Joint Technical Document (JTD) for the landfill. The information in the ROWD/JTD has been used in revising these waste discharge requirements (WDRs). The ROWD contains the applicable information required in Title 27. The ROWD/JTD and supporting documents contain information related to this revision of the WDRs including:
 - a. Discharge of effluent from Groundwater Extraction and Treatment Plant water to an infiltration basin.
 - b. Injection of limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing Volatile Organic Compounds (VOCs) concentrations in groundwater.
 - c. Revisions to the Detection Monitoring Program.
5. On 2 August 2007, the Central Valley Water Board issued Order R5-2007-0107 in which the landfill waste management units at the facility were classified as Class III units for the discharge of non-hazardous waste, and municipal solid waste. This Order continues to classify the landfill units as Class III units in accordance with Title 27.
6. The existing and future landfill units authorized by this Order are described as follows:

<u>Unit</u>	<u>Module</u>	<u>Area</u>	<u>Liner/LCRS¹ Components²</u>	<u>Unit Classification & Status</u>
Landfill 1	M-1	158.5 acres	Unlined	Class III, active.
Landfill 1	M-1L	65.7 acres	Single liner system with compacted clay or GCL. LCRS consists of 12-inches pea gravel on floor, 6-inch collection pipe; 24 inches of screened sand on side slopes.	Class III, active
Landfill 2	M-2 M-3	30.3 acres 50.6 acres	Double liner system with GCL on base. Single liner system with GCL on side-slopes. LCRS consists of 12-inches pea gravel on floor, 6-inch collection pipe; 24 inches of screened sand on side slopes.	Class III, active

<u>Unit</u>	<u>Module</u>	<u>Area</u>	<u>Liner/LCRS¹ Components²</u>	<u>Unit Classification & Status</u>
Landfill 2	M-4 to M-11	354.1 acres	Double liner system with GCL on base. Single liner system with GCL on side-slopes. LCRS consists of 12-inches pea gravel on floor, 6-inch collection pipe; 24 inches of screened sand on side slopes.	Class III, future

¹ LCRS – Leachate collection and removal system

² All liner systems are composite liner systems unless otherwise noted

³ GCL – Geosynthetic clay liner

7. Support facilities include the office buildings, scalehouse, equipment maintenance building, access roads, materials recovery and storage areas (for wood, greenwaste, tires, construction materials, appliances, etc.), an inert waste processing area, public drop-off facility for antifreeze, batteries, motor oil, latex paint (ABOP) and universal wastes, sedimentation basins, a landfill gas flaring plant, landfill gas-to-energy plants, a groundwater extraction and treatment plant, and other facilities, see Attachments B and C.
8. On 9 October 1991, the United States Environmental Protection Agency (USEPA) promulgated federal MSW regulations under the Resource Conservation and Recovery Act (RCRA), Subtitle D. These regulations are under 40 Code of Federal Regulations section 258, and are hereafter referred to as either “Subtitle D” in reference to the RCRA federal law that required the regulations or “40 C.F.R. section 258.XX”. These regulations apply to all California Class II and Class III landfills that accept MSW. State Water Board Resolution 93-62 requires the Central Valley Water Board to implement in WDRs for MSW landfills the applicable provisions of the federal MSW regulations that are necessary to protect water quality, and in particular the containment provisions and the provisions that are either more stringent or that do not exist in Title 27.
9. This Order implements the applicable regulations for discharges of solid waste to land through Prohibitions, Specifications, Provisions, and monitoring and reporting requirements. Prohibitions, Specifications, and Provisions are listed in Sections A through H of these WDRs below, and in the Standard Provisions and Reporting Requirements (SPRRs) dated December 2015 which are part of this Order. Monitoring and reporting requirements are included in the Monitoring and Reporting Program (MRP) R5-2016-0013 and in the SPRRs. In general, requirements that are either in regulation or otherwise apply to all MSW landfills are considered to be “standard” and are therefore in the SPRRs. Any site-specific changes to a requirement in the SPRRs are included in the applicable section (A through H) of these WDRs, and the requirement in the WDRs supersedes the requirement in the SPRRs.

10. Title 27 contains regulatory standards for discharges of solid waste promulgated by the State Water Board and the California Department of Resources Recovery and Recycling (CalRecycle). In certain instances, this Order cites CalRecycle regulatory sections. Title 27, section 20012 allows the Central Valley Water Board to cite CalRecycle regulations from Title 27 where necessary to protect water quality provided it does not duplicate or conflict with actions taken by the Local Enforcement Agency in charge of implementing CalRecycle's regulations.

WASTE CLASSIFICATION AND UNIT CLASSIFICATION

11. The Discharger proposes to continue to discharge nonhazardous solid waste, including municipal solid waste to lined and/or unlined Class III landfill units at the facility. These classified wastes may be discharged only in accordance with Title 27, Resolution 93-62, and Subtitle D as required by this Order.
12. Special wastes discharged at the landfill include treated infectious wastes, triple-rinsed empty pesticide containers, non-friable asbestos, and dead animal carcasses using special disposal and handling procedures. The landfill also accepts Publicly Owned Treatment Works (POTW) grit and screenings, and biosolids with a minimum 20 percent solids and no free moisture. Biosolids are only accepted from the Sacramento Regional Wastewater Treatment Plant on an infrequent, emergency basis. The landfill also accepts construction and demolition debris. These special wastes may be discharged to composite lined Class III landfill units at the facility in accordance with Title 27, Resolution 93-62, and Subtitle D as required by this Order.
13. Active unlined landfill units at the facility are "existing units" under Title 27 that were permitted before 27 November 1984 and may continue to accept waste in the "Existing Footprint" until ready for closure unless waste receipts do not meet the timeframes and amounts in Title 27, section 21110, or they are required to close sooner to address environmental impacts or other regulatory concerns. The "Existing Footprint" as defined in Title 27, section 20164 is the area that was covered by waste as of the date that the landfill unit became subject to Subtitle D. The Existing Footprint for Module M-1, the active unlined area of the landfill, is shown on Attachment B.
14. The Discharger proposes to continue to discharge treated wood waste in the composite-lined units at the landfill. Title 22 defines "treated wood" to mean wood that has been treated with a chemical preservative for purposes of protecting the wood against attacks from insects, microorganisms, fungi, and other environmental conditions that can lead to decay of the wood and the chemical preservative is registered pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 and following). This may include but is not limited to waste wood that has been treated with chromated copper arsenate (CCA), pentachlorophenol, creosote, acid copper chromate (ACC), ammoniacal copper arsenate (ACA), ammoniacal copper zinc arsenate (ACZA), or chromated zinc chloride (CZC).

15. Title 22, section 67386.11 allows treated wood waste to be discharged to a composite-lined portion of a MSW landfill that is regulated by WDRs issued pursuant to the Water Code provided that the landfill owner/operator:
 - a. Comply with the prohibitions in Title 22, section 67386.3, which are:
 - i. Treated wood waste shall not be burned, scavenged, commingled with other waste prior to disposal, stored in contact with the ground, recycled without treatment (except as in iii, below), treated except in compliance with Title 22, section 67386.10, or disposed to land except in compliance with Title 22, section 67386.11.
 - ii. Any label or mark that identifies the wood and treated wood waste shall not be removed, defaced, or destroyed.
 - iii. Treated wood waste may be recycled only by reuse when all of the following apply:
 - (1) Reuse is on-site.
 - (2) Reuse is consistent with FIFRA approved use of the preservative.
 - (3) Prior to reuse, treated wood waste is handled in compliance with Title 22, division 4.5, chapter 34.
 - b. Ensure treated wood waste is managed at the landfill according to Title 22, division 4.5, chapter 34 prior to disposal.
 - c. Monitor the landfill for a release and if a verified release is detected from the unit where treated wood is discharged, the disposal of treated wood will be terminated at the unit with the verified release until corrective action ceases the release.
 - d. Handle treated wood waste in a manner consistent with the applicable sections of the California Occupational Safety and Health Act of 1973.
16. Title 27, section 20690 allows the use of alternative daily cover (ADC) at MSW landfills upon approval by the Local Enforcement Agency (LEA) and concurrence from CalRecycle. Title 27, section 20705 provides the Water Board's regulations for all daily and intermediate cover including that it shall minimize the percolation of liquids through waste and that the cover shall consist of materials that meet the landfill unit classification (Class II or Class III). The regulations also require that for non-composite lined portions of the landfill, that any contaminants in the daily or intermediate cover are mobilized only at concentrations that would not adversely affect beneficial uses of waters of the state in the event of a release. For composite-lined portions of the landfill, the regulations require that constituents and breakdown products in the cover material are listed in the water quality protection standard.

17. The Discharger uses the following materials for ADC: temporary geosynthetic tarps, degradable geosynthetic covers, processed green materials, compost materials, processed construction and demolition wastes and materials, shredded tires (mixed with soil), and wood ash (non-hazardous, non-designated ash from wood-fired energy generation facilities). The Discharger has demonstrated that these materials will minimize percolation of liquids through waste, that they meet the unit classification where they will be discharged, and that the constituents and breakdown products are included in the water quality protection standard.
18. Landfills propose new ADC materials regularly in order to preserve landfill air space and to beneficially reuse waste materials. Title 27, section 20686 includes regulations for beneficial reuse, including use of ADC. Approval of ADC is primarily handled by the LEA and CalRecycle under Title 27, section 20690. This Order allows any ADC proposed for use at the facility after the adoption of this Order to be approved by Central Valley Water Board staff provided the Discharger has demonstrated it meets the requirements in Title 27, section 20705. The approved ADC materials should then be listed in the facility's WDRs during the next regular update or revision with information about the Discharger's demonstration. This Order also includes a requirement that ADC only be used in internal areas of the landfill unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality. The demonstration can take sedimentation basins into account.
19. The Discharger proposes to return leachate and landfill gas condensate to the composite-lined landfill units from which they came. Title 27, section 20340(g) requires that leachate be returned to the unit from which it came or be discharged in a manner approved by the regional board. This section of Title 27 also references State Water Board Resolution 93-62 regarding liquids restrictions in 40 C.F.R. section 258.28 for MSW landfills. 40 C.F.R. section 258.28 states that liquid waste may not be placed in MSW landfill units unless the waste is leachate or gas condensate derived from the landfill unit and it is designed with a composite liner and an LCRS. Therefore, leachate and landfill gas condensate from composite lined units with an LCRS may be returned to the unit from which they came. This Order includes requirements for returning leachate and landfill gas condensate back to composite-lined units such that the liquid waste is not exposed to surface water runoff, will not cause instability of the landfill, and will not seep from the edges of the units.
20. The primary method of leachate management is recirculation in the lined portions of the landfill. Additionally, leachate may be used for dust control over composite lined areas of the landfill in compliance with Discharge Specification B.11. Leachate production is closely monitored to ensure that the moisture holding capacity of the refuse is not exceeded. Transportation to the local POTW is the alternative method of leachate disposal if the recirculation system is not operable.

SITE DESCRIPTION

21. The area surrounding the facility is low rolling Sierra Foothill terrain, with natural elevations varying between approximately 100 and 250 feet above mean sea level (MSL). No known springs are located within one mile of the facility. Several surface water bodies are located within 1 mile of facility. Blodgett Reservoir is located less than 0.5 mile northwest of the site, on Laguna Creek, and is used primarily for recreation. Additional small, seasonal reservoirs are present throughout the area and are used as stock tanks by local ranchers. Intermittent streams traverse the area and drain the site. Laguna Creek drains the area north of the facility and is a tributary of the Sacramento River. The confluence is located approximately 18 miles west of the site. Deer Creek drains the area south of the facility and is a tributary of the Cosumnes River. The confluence is located approximately 13 miles southwest of the site. Surface water drained from the facility ultimately flows into the San Pablo and San Francisco bays.
22. Land use within one mile of the facility is designated for agricultural use including pasture, livestock grazing, crop growing, and residential.
23. There are 59 water supply wells within one mile of the site, including 28 used for irrigation, 22 for domestic supply, one for livestock, two for on-site industrial supply, and 6 unknown wells.
24. Kiefer Landfill and surrounding areas are located on the geomorphic unit termed "dissected alluvial uplands" (United States Geological Survey (USGS), 1985). Geologic units observed at Kiefer Landfill include the Quaternary Alluvium, Laguna, Mehrten, Valley Springs, and lone Formations. Quaternary Alluvium and Laguna Formations that consists of sandy-gravel to sandy channel facies and sandy clay to clay floodplain deposits. The Mehrten Formation includes a sequence of variably cemented, interbedded clay, sand, and gravel that unconformably overlies the Valley Springs and lone Formations. Geologic stratigraphy was re-evaluated in 2015 and the Discharger reports that the strata now assigned to the Valley Springs Formation were originally included in the lone Formation as the "clay rock or tuff," the highest of three subdivisions of the lone (USGS, 1992). The lone Formation consists of variably cemented, fine to coarse sandstone, siltstone, lignite, and claystone with variegated colors including red, yellow, white, blue, gray, orange, and black.
25. Quaternary Alluvium, the Laguna Formation, the Mehrten Formation, the Valley Springs Formation and the lone Formation, in that order, underlie the site. These formations dip slightly to the west and are summarized as follows:
 - The Quaternary alluvium is confined to an area south of Landfill Unit 1.
 - The Laguna Formation is present as a thin gravel layer, which outcrops on the southern part of the site.

- The base of the landfill cuts the Mehrten Formation, which underlies the Laguna, in the southern part of the site. It varies from 300 to 350 feet in thickness and is subdivided into upper and lower units.
 - The upper Mehrten is subdivided into three sand sequences (the "shallow", "middle", and "deep" zones), which are composed of sandstone, siltstone, and claystone, and separated by mudstone. The beds have varying thickness and lateral continuity. Some of the thicker beds appear to be more laterally extensive, and split into several thinner, finer-grained beds. In the northern portion of the facility the shallow zone beds are thicker and coarser, whereas to the south they appear to split, thin, and pinch out.
 - The Lower Mehrten consists of thick sand and gravel beds with possibly some volcanic mudflow. The sand appears relatively uniform in thickness and widespread in extent.
 - The Lower Mehrten formation is underlain by Valley Springs Formation and Lone Formation. The Valley Springs Formation consists of volcanic sandstone (lava sand) and claystone. The Lone Formation consists of variably cemented, fine to coarse sandstone, siltstone, lignite, and claystone with variegated colors including red, yellow, white, blue, gray, orange, and black.
26. The measured hydraulic conductivity of the native soils underlying the Unit ranges between 1.8×10^{-6} and 1.8×10^{-4} centimeters per second (cm/sec) based on packer and infiltration testing conducted in the field in 1988. Saturated hydraulic conductivity testing conducted during 2006 during borrow-source investigation for final cover material ranged from 7.8×10^{-8} and 2.2×10^{-4} cm/sec. Areas with relatively clean sand soils with saturated hydraulic conductivity greater than 1×10^{-3} cm/sec also underlie the site.
27. The Bear Mountains and Melones fault zones, part of the Sierra Foothills fault system, are approximately 10 and 19 miles east of the facility, respectively. Neither of these fault zones is considered active. The closest Holocene faults are approximately 40 miles from the site with Maximum Probable Earthquake (MPE) magnitude of 5.7 to 6.4 that would result in Peak Ground Acceleration (PGA) of 0.02 to 0.05 g at the site. The San Andreas Fault, located approximately 90 miles to the southwest and an MPE of 8.0 would result in a PGA of 0.06 g at the facility.
28. The average annual precipitation at the Sacramento City National Weather Service Station is 17.87 inches. The facility receives an average of 19 inches of precipitation per year based on a 1996 Sacramento County isohyetal map. The mean pan evaporation is 66.2 inches per year as measured at the Folsom Dam Station (Western Regional Climate Center, 2005).
29. The 100-year, 24-hour precipitation event is estimated to be 4.39 inches at the Sacramento City National Weather Service Station (DWR 1976) and 5.09 inches at the facility (NOAA Point Precipitation Frequency Estimates 2015).

30. A revised Flood Insurance Rate Map published by the Federal Emergency Management Agency (FEMA) on 12 October 1999 indicates that approximately 4.5 acres of the southern portion of the proposed Sedimentation Basin will occupy the revised FEMA 100-year floodplain. This basin will be constructed adjacent to Module M-10 sometime during or after the filling of Module M-9 (refer to Attachment B). The current landfill does not occupy any of the temporary storage volume for a 100-year flood, nor restrict the 100-year flood. The creation of the proposed Sedimentation Basin will reduce the existing flood volume by approximately 14,500 cubic yards. This volume will be replaced by excavating an equal quantity of soil below the floodplain elevation of 108 feet MSL onsite or adjusting the configuration of the basin to avoid the floodplain altogether. This will satisfy the floodplain requirements of Subtitle D (40 CFR 258.11).
31. Storm water runoff from a majority of the landfill areas is captured via a network of drainage ditches called the on-site channel along the north and east perimeter of Landfill Unit 1. The on-site channel empties into Sedimentation Basin A at the southeast end of the landfill. Storm water runoff from the west facing slopes of Landfill Unit 2 M-2 and M-3 drains to Sedimentation Basin B that is adjacent to Landfill Unit 2 M-2. Refer to Attachment B for locations of these basins. Retained water within the basins evaporates, percolates into the ground, or is discharged to the off-site channel following primary sediment removal. Additionally, runoff from the undeveloped area of the facility is diverted around the landfill by a perimeter drainage channel (off-site channel) with in-line sedimentation basins. This off-site channel exits the facility at Kiefer Boulevard and ultimately discharges to Deer Creek.

SURFACE WATER AND GROUNDWATER CONDITIONS

32. The *Water Quality Control Plan for Sacramento and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.
33. The northern part of the facility is in the Franklin/Florin Hydrologic Sub-Areas (HSAs), Morrison Creek Hydrologic Area (HA) of the Valley-American Hydrologic Unit (HU) in the Sacramento Hydrologic Basin Planning Area (as depicted on the interagency hydrologic maps prepared by the Department of Water Resources in August 1986), and is naturally drained by Laguna Creek, a seasonal water tributary to the Sacramento River.
34. The southern portion of the facility is in the Lower Deer Creek HSA, Lower Cosumnes-Dry Creek HA of the North Valley Floor HU in the San Joaquin River Basin Planning Area, and is naturally drained by Deer Creek, tributary to the Cosumnes River, thence the Mokelumne River.
35. The designated beneficial uses of the Sacramento and Cosumnes Rivers, as specified in the Basin Plan, are municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, navigation, water contact recreation, non-contact water

recreation, warm freshwater habitat, cold freshwater habitat, wildlife habitat, migration of aquatic organisms, and spawning, reproduction, and/or early development.

36. The first encountered groundwater ranges from about 25 feet to 50 feet MSL. Groundwater is present in three zones. The shallow A-zone and deeper B-zone produce groundwater from discontinuous sand units in the upper Mehrten Formation. The A-zone lies between approximately 60 and -20 feet mean sea level (MSL), with first encountered groundwater at about 60 to 190 feet below ground surface. The B-zone lies between approximately -20 and -100 feet MSL. The deep C-zone is located within laterally extensive sands of the lower Mehrten and underlying Valley Springs Formation at approximately -150 to -250 feet MSL. Zones A and B are hydraulically connected and potentially represent the same aquifer, whereas Zone C is hydraulically disconnected from the A- and B-zones.
37. Monitoring data indicates background groundwater quality in the A-zone has an electrical conductivity (EC) typically ranging between 180 and 480 micromhos/cm, with total dissolved solids (TDS) typically ranging between 150 and 340 milligrams per liter (mg/L). The B-zone and C-zone background groundwater data are similar to the A-zone data.
38. The direction of groundwater flow at the facility is toward the west-southwest, with localized gradient flows more to the west in the vicinity of Deer Creek, as a result of groundwater infiltration of creek waters. The average groundwater gradient for A-, B-, and C-zones is approximately 0.0054, 0.0048, 0.00234 feet per foot, respectively. The average groundwater velocity for A-, B-, and C-zones is typically about 235, 211, 103 feet per year, respectively.
39. Most regional and on-site groundwater production is from the Lower Mehrten and Valley Springs Formations, which are part of the extensive groundwater aquifer system underlying the Sacramento Valley. The regional gradients are to the southwest, and are influenced by recharge from the American and Cosumnes Rivers, and heavy pumping near Elk Grove. West of the facility, the Laguna Formation is also a source of water supply.
40. The designated beneficial uses of the groundwater, as specified in the Basin Plan, are domestic and municipal water supply, agricultural supply, industrial service supply, and industrial process supply.

GROUNDWATER AND UNSATURATED ZONE MONITORING

41. The groundwater monitoring system at the landfill consists of detection monitoring wells within each of the three zones (A, B, and C-zones) and corrective action monitoring wells within the A and B-zones. There are currently 36 monitoring wells in the A-zone, 23 wells in the B-zone, and 6 wells in the C-zone. Additional monitoring wells will be installed as future modules are constructed. A current listing of monitoring wells and

their associated monitoring programs are listed (as of the date of this Order) in the Table below and in MRP R5-2016-0013, a part of this Order. The monitoring system is shown on Attachment D1 and D2, which is incorporated herein and made part of this Order by reference.

<u>Well</u>	<u>Status</u>	<u>Zone</u>
MW-1A	Corrective Action	A
MW-1B	Corrective Action	B
MW-2A	Corrective Action	A
MW-2B	Corrective Action	B
MW-2C	Detection	C
MW-2A1	Corrective Action	A
MW-3A	Corrective Action	A
MW-4A	Corrective Action	A
MW-4B	Corrective Action	B
MW-5A	Corrective Action	A
MW-5B	Detection	B
MW-6A	Corrective Action	A
MW-6A1	Detection	A
MW-6B	Detection	B
MW-7AR	Corrective Action	A
MW-7B	Corrective Action	B
MW-9A	Corrective Action	A
MW-9B	Corrective Action	B
MW-10A	Background	A
MW-10B	Background	B
MW-10C	Background	C
MW-11A	Corrective Action	A
MW-11B	Corrective Action	B
MW-12A	Detection	A
MW-12B	Detection	B
MW-12C	Detection	C
MW-15A	Corrective Action	A
MW-15B	Detection	B
MW-16A	Corrective Action	A
MW-16B	Corrective Action	A
MW-17A	Detection	A
MW-17B	Detection	B
MW-18A	Corrective Action	A
MW-19A	Corrective Action	B
MW-20A	Corrective Action	A
MW-20B	Corrective Action	B
MW-20C	Detection	C
MW-21A	Corrective Action	A

<u>Well</u>	<u>Status</u>	<u>Zone</u>
MW-21B	Corrective Action	B
MW-22A	Corrective Action	A
MW-22B	Detection	B
MW-23A	Corrective Action	A
MW-23B	Detection	B
MW-24A	Corrective Action	A
MW-27A	Detection	A
MW-28A	Corrective Action	A
MW-29A	Corrective Action	A
MW-30A	Corrective Action	A
MW-36A	Detection	A
MW-37A	Corrective Action	A
MW-37B	Corrective Action	B
MW-37C	Detection	C
MW-38A	Background	A
MW-38B	Background	B
MW-39A	Background	A
MW-39B	Background	B
MW-40A	Corrective Action	A
MW-40B	Detection	B
MW-41A1	Corrective Action	A
MW-41A2	Corrective Action	A
MW-41B	Corrective Action	B
MW-42A	Detection	A
MW-42B	Detection	B
MW-43A	Detection	A
Well E	Detection	C

42. At the time this Order was adopted, the Discharger's detection monitoring program for groundwater at the landfill satisfied the requirements contained in Title 27.
43. The unsaturated zone monitoring system at the landfill includes suction lysimeters and pan lysimeters, as well as numerous landfill gas monitoring probes. The unsaturated zone monitoring network currently consists of one background suction lysimeter (LYS-10U) and six downgradient suction lysimeters (LYS-1U, 2U, 7U, 13UN, 13US, and 14U). Six active suction lysimeters are located beneath Module M-1L (VZ-1, 2, 3, 4, 8, and 9). Pan lysimeters are and will be located beneath the sumps of each of the lined Modules M-2 through M-11 (LYS-M2 through LYS-M11). The unsaturated zone monitoring network is shown on Attachment D1 and D2. The detection monitoring program for the unsaturated zone at the landfill satisfies the requirements contained in Title 27.
44. Volatile organic compounds (VOCs) are often detected in a release from a MSW landfill and are often associated with releases of landfill gas rather than leachate. Since volatile

organic compounds are not naturally occurring and thus have no background value, they are not amenable to the statistical analysis procedures contained in Title 27 for the determination of a release of wastes from a landfill unit. Title 27, sections 20415(e)(8) and (9) allows the use of a non-statistical evaluation of monitoring data that will provide the best assurance of the earliest possible detection of a release from a landfill unit in accordance with Title 27, sections 20415(b)(1)(B)2.-4. However, Title 27 does not specify a specific method for non-statistical evaluation of monitoring data.

45. In order to provide the best assurance of the earliest possible detection of a release of non-naturally occurring waste constituents from a landfill unit, the SPRRs specify a non-statistical method for the evaluation of monitoring data for non-naturally occurring compounds. The specified non-statistical method for evaluation of monitoring data provides two criteria (or triggers) for making the determination that there has been a release of non-naturally occurring waste constituents from a landfill unit. The presence of two non-naturally occurring waste constituents above their respective method detection limit (MDL), or one non-naturally occurring waste constituent detected above its practical quantitation limit (PQL) [a.k.a, laboratory reporting limit (RL)], indicates that a release of waste from a Unit has occurred. Following an indication of a release, verification testing must be conducted to determine whether there has been a release from the landfill unit or the detection was a false detection. The detection of two non-naturally occurring waste constituents above the MDL as a trigger is appropriate due to the higher risk of false-positive analytical results and the corresponding increase in sampling and analytical expenses from the use of one non-naturally occurring waste constituent above its MDL as a trigger.
46. For a naturally occurring constituent of concern, the Title 27 requires concentration limits for each constituent of concern be determined as follows:
 - a. By calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8); or
 - b. By an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).
47. The Discharger submitted a 17 September 2015 Detection Monitoring Program report including a Water Quality Protection Standard (WQPS) proposing statistical data analysis methods to calculate concentration limits for each monitored constituent in accordance with Title 27. The WQPS report proposed to use Interwell data analysis to calculate tolerance limits for the monitored constituents. The WQPS and approved data evaluation methods are included in MRP R5-2016-0013.

GROUNDWATER CONDITIONS (OR DEGRADATION AND CORRECTIVE ACTION)

48. A release of waste constituents from the landfill to groundwater was discovered in 1989. Numerous detection and corrective action monitoring wells have since been installed in the A, B, and C-zones of the Mehrten formation, as identified on Attachment D1 and D2.
49. Monitoring of the A-zone shows the presence of various VOCs, including, but not limited to, tetrachloroethene, trichloroethene, 1,2-dichloroethene, and vinyl chloride. The A-zone VOC plume extends beyond the landfill footprint about 4,000 feet to the southwest to MW-41. The source area was identified as the unlined landfill Module M-1. The plume has also migrated down into the B-zone, where concentrations are lower and the plume is less extensive. VOCs have not been detected in the C-zone since 1999 when trace levels were reported in MW-2C. For the last 15 years, all C-zone wells have been part of the detection monitoring program.
50. In 1995, the Discharger installed a groundwater extraction system to remediate VOCs in groundwater, including several A-zone extraction wells and a pump and treat system. The current groundwater extraction system consists of 14 wells with 8 extraction wells in operation with a combined average rate of about 400 gallons per minute. The extraction wells are shown in Attachments D1 and D2. The system also includes two air stripper towers. Pump and treat remediation began in April 1995, with the objective of containing the spread of the plume and reducing VOC levels in the source area. According to the January 2015, 2014 Annual Report, submitted by the Discharger, groundwater extraction has removed over 800 pounds of VOCs from the groundwater since 1995, and resulted in an approximate 81 percent reduction in mass of VOCs in the groundwater. Treated groundwater is discharged to Deer Creek under NPDES Permit CA0083681 (Order R5-2013-0002).
51. The Discharger is proposing to discharge extracted groundwater to an infiltration basin to potentially reduce the carbon footprint of the groundwater treatment system and provide a beneficial re-use of groundwater through aquifer recharge. Prior to the discharge of extracted groundwater to the infiltration basin, the Discharger shall submit a Discharge Basin Pilot Study Work Plan for written Executive Officer approval, as detailed in Discharge Specification B.13.
52. The Discharger proposes to inject limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing the remaining VOCs concentrations in groundwater. Prior to conducting the pilot test, the Discharger shall submit a Hydrogen Release Compound Injection Pilot Test Work Plan for written Executive Officer approval, per the General Order R5-2008-0149 requirements as detailed in Discharge Specification B.10.
53. In 1997, the Discharger installed a landfill gas control system to prevent further migration of landfill gas to groundwater. The current system includes a gas flaring facility and a landfill gas-to-energy plant with a combined extraction rate capability of 14,500 standard

cubic feet per minute. The system currently includes approximately 320 extraction devices including gas probes, vertical extraction wells, horizontal extraction wells, and leachate cleanouts. LFG is collected from these extraction devices using a network of collection piping. The collection piping is configured as a loop and services the entire landfill footprint. Future Modules M-4 through M-11 will also be connected to the landfill gas extraction system, and its extraction capability will be expanded as needed. Limited landfill gas extraction is also performed to remediate pockets of landfill gas that still exist in the subsurface outside of the landfill modules. The landfill gas collection system is shown on Attachment E.

LINER PERFORMANCE DEMONSTRATION

54. On 15 September 2000, the Central Valley Water Board adopted Resolution 5-00-213 *Request For The State Water Resources Control Board To Review The Adequacy Of The Prescriptive Design Requirements For Landfill Waste Containment Systems To Meet The Performance Standards Of Title 27*. The State Water Board responded, in part, that “a single composite liner system continues to be an adequate minimum standard” however, the Central Valley Water Board “should require a more stringent design in a case where it determines that the minimum design will not provide adequate protection to a given body of groundwater.”

In a letter dated 17 April 2001, the Executive Officer notified Owners and Operators of Solid Waste Landfills that “the Board will require a demonstration that any proposed landfill liner system to be constructed after 1 January 2002 will comply with Title 27 performance standards. A thorough evaluation of site-specific factors and cost/benefit analysis of single, double, and triple composite liners will likely be necessary.”

55. During 2002, the Discharger submitted liner performance demonstration reports that included computer modeling indicating that a single composite liner system with barrier layers consisting of 60-mil high density polyethylene (HDPE) and a geosynthetic clay liner (GCL) would meet the performance standards of Title 27. Based on Regional Water Board staff concerns about the proposed liner system, the Discharger proposed and installed a double composite liner system on the base of Module M-2 (single composite on the side slopes) and conducted extensive monitoring of the system as required by previous WDRs Order R5-2002-0187. The data from this monitoring was to be used to demonstrate whether the proposed single composite liner system meets the performance standard.
56. On 30 March 2007, the Discharger submitted a *Final Liner Performance Demonstration Update* report. The report included detailed analysis and assessment of the data collected from Module M-2 and compared the data with other data collected during historical liner system assessment projects conducted in cooperation with the United States Environmental Protection Agency (USEPA). The data from Module M-2 indicates that the upper single composite liner system performed favorably compared with other HDPE/GCL composite liner systems studied by USEPA, having captured approximately

99.7% of leachate generated by Module M-2. This is compared with an average 98.9% efficiency for the 28 landfills evaluated by USEPA. The Discharger's report concludes that either the single composite liner system, or the double composite liner system, meet the Title 27 performance standards. The report also notes that the secondary composite base liner system provides redundancy and additional protection and recommends that future landfill modules are constructed with the same double composite liner system on the base as Module M-2. This Order requires a double composite liner system on the base, and single composite liner system on the side slopes, for Module M-4 and all future landfill modules at the Kiefer Landfill. This Order also finds that the proposed liner system meets the Title 27 performance standards at the Kiefer Landfill.

CONSTRUCTION AND ENGINEERED ALTERNATIVE

57. On 17 June 1993, the State Water Board adopted Resolution 93-62 implementing a State Policy for the construction, monitoring, and operation of municipal solid waste landfills that is consistent with the federal municipal solid waste regulations promulgated under 40 Code of Federal Regulations section 258 (a.k.a, Subtitle D). Resolution 93-62 requires the construction of a specified composite liner system at new municipal solid waste landfills, or expansion areas of existing municipal solid waste landfills, that receive wastes after 9 October 1993. Resolution 93-62 also allows the Central Valley Water Board to consider the approval of engineered alternatives to the prescriptive standard. Section III.A.b. of Resolution 93-62 requires that the engineered alternative liner systems be of a composite design similar to the prescriptive standard.
58. Title 27, section 20080(b) allows the Central Valley Water Board to consider the approval of an engineered alternative to the prescriptive standard. In order to approve an engineered alternative in accordance with Title 27, sections 20080(c)(1) or (2), the Discharger must demonstrate that the prescriptive design is unreasonably and unnecessarily burdensome and will cost substantially more than an alternative which will meet the criteria contained in Title 27, section 20080(b), or would be impractical and would not promote attainment of applicable performance standards. The Discharger must also demonstrate that the proposed engineered alternative liner system is consistent with the performance goal addressed by the particular prescriptive standard, and provides protection against water quality impairment equivalent to the prescriptive standard in accordance with Title 27, section 20080(b)(2).
59. Water Code section 13360(a)(1) allows the Central Valley Water Board to specify the design, type of construction, and/or particular manner in which compliance must be met in waste discharge requirements or orders for the discharge of waste at solid waste disposal facilities.
60. Module M-1L of Landfill 1 was constructed in phases approved in previous WDRs Order 95-078 and Order 99-053 as an engineered alternative design (EAD) to the prescriptive Title 27 and Subtitle D designs. The formerly approved EAD allowed for substituting a GCL for one foot of clay in Phase II and two feet of clay for subsequent phases.

61. The Discharger justified the EAD based on the lack of available onsite clay and inadequate shear properties of local offsite clay, which made it unsuitable for WMU construction. The Discharger adequately demonstrated that construction of a Subtitle D prescriptive standard liner would be unreasonably and unnecessarily burdensome when compared to the proposed engineered alternative design. The Discharger demonstrated that the proposed engineered alternative is consistent with the performance goals of the prescriptive standard and affords at least equivalent protection against water quality impairment.
62. Following the liner demonstration analyses conducted in 2002 as detailed in Finding 55 and installation of a double composite liner system in Module M-2 (Finding 56), the Discharger proposed to install a double composite liner system in future modules. The Discharger proposes a double composite liner system using HDPE and GCL that was constructed at Modules M-2 and provides additional protection compared with the previously approved EAD. The proposed double composite liner system consists of the following:
- Primary Liner System: Base**
- minimum one-foot operations layer
 - nonwoven geotextile filter fabric (minimum eight oz. per square yard)
 - one-foot gravel drainage layer ($k \geq 0.1$ cm/sec)
 - 60-mil HDPE geomembrane (bottom side textured)
 - geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
 - a compositely lined sump
- Secondary Liner System: Base**
- one-foot gravel drainage layer ($k \geq 0.1$ cm/sec), or a geosynthetic drainage layer
 - 60-mil HDPE geomembrane (bottom side textured)
 - geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
 - a compositely lined sump
- Liner System: Side Slopes**
- Minimum two-foot sand operations layer/drainage layer ($k \geq 1 \times 10^{-3}$ cm/sec)
 - 60-mil HDPE geomembrane (bottom side textured)
 - geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
63. The proposed liner system includes a primary LCRS consisting of one foot of gravel ($k \geq 0.1$ cm/sec) on the base and two feet of sand ($k \geq 1 \times 10^{-3}$ cm/sec) on the side slopes. Calculations submitted by the Discharger indicate that this LCRS design, along with the leachate collection piping, is capable of transmitting twice the anticipated maximum volume of leachate that can be generated by the landfill under conditions when only 15 feet of waste has been placed. Leachate is collected and recirculated to the lined portions of the landfill.
64. The Discharger also proposes to construct a primary LCRS sump and a secondary LCRS sump, each equipped with dedicated pumps for removal of leachate. A pan

lysimeter will also be constructed beneath the sump area of each landfill module to comply with the unsaturated zone monitoring requirements of Title 27, as was done at Modules M-2 and M-3.

65. The Discharger proposes a liner system which will be designed, constructed, and operated in accordance with the criteria set forth in Title 27, and the provisions in State Water Board Resolution 93-62 for municipal solid wastes.
66. The 22 September 2015 ROWD includes a 1996 stability analysis for base grades, interim fill slopes, and final cover throughout the site, and a 2011 stability analysis for base grades and interim fill slopes for the most recently constructed Module M-3, Phase 3 pursuant to Title 27, section 21750(f)(5). The Discharger's stability analysis includes components to demonstrate the integrity of the landfill foundation, final slopes, and containment systems under both static and dynamic conditions throughout the landfill's life including the closure period and post-closure maintenance period. The stability analysis demonstrates that the structural components of Module M-3, Phase 3 will withstand the forces of the Maximum Probable Earthquake (MPE) without failure of the containment systems or environmental controls.
67. This Order approves the Discharger's proposed liner system for future modules as described in Finding 6 and requires that the Discharger submit design plans and construction quality assurance (CQA) plans for each new module or modules for review and approval at least 180 days prior to construction.

MODULE M-1 CLOSURE AND ENGINEERED ALTERNATIVE FINAL COVER

68. During 1990, a prescriptive final cover (one foot of 1×10^{-6} cm/sec clay and one foot vegetative soil) was installed on approximately 34 acres of unlined Module M-1. This portion of the landfill has received its final closure.
69. On 30 March 2007, the Discharger submitted an *Engineered Alternative Design Report* as part of the amended ROWD/JTD with information supporting an alternative final cover system for the unclosed portions of the unlined Module M-1. The proposed alternative final cover is an evapotranspirative cover, also known as a water balance cover. This type of cover functions by storing moisture between the soil particles during the rainy season, and releasing that moisture during the growing season and dry season through plant uptake and evaporation. As with the engineered alternative liner system, the Discharger must make the demonstrations required in Title 27, as listed in Finding 58 of this Order. The demonstration is described in the following Findings.
70. In preparation for the design of the proposal alternative final cover, the Discharger has completed several studies and design reports. The largest of these was a six year pilot study of two test sections conducted under the Alternative Covers Assessment Project (ACAP), a USEPA program conducted in coordination with Dr. Craig Benson of the University of Wisconsin, and Dr. Bill Albright of the Desert Research Institute. The Kiefer

Landfill project was one of many ACAP projects conducted in California and the United States. In summary, the project consisted of two large test sections (20 meters by 30 meters) of constructed final cover using onsite soils similar to those that are expected to be used in the eventual final cover for the landfill. The “thin” test section was 43 inches (3.6 feet) thick, and the “thick” test section was 96 inches (8 feet) thick. Each section was underlain by a large pan lysimeter (10 meters by 20 meters) designed to capture and record any moisture that drained through the soil cover. The results indicated that the thin test section allowed drainage averaging about 51 millimeters (mm) per year, and that the thick test section allowed drainage averaging about 2.5 mm/year. The report also concluded that the drainage seen from the thin test section was due to moisture not being adequately removed from the soil prior to the next rainy season, and the reason was that the proper vegetation to remove the moisture was not maintained. It should be noted that the thin test section performed well through the first and second rainy seasons, but began draining during the third rainy season because sufficient moisture was not removed after the second rainy season.

71. Other studies performed by the Discharger related to the alternative final cover include:
- a. A soil borrow source study to assess the suitability and availability of onsite soils for the alternative cover, including nutrients for plants.
 - b. A study of the thickness and properties of the existing interim cover soils on Module M-1.
 - c. A design report for selection, monitoring, and maintenance of vegetation for the alternative final cover.
 - d. Hydrogeologic modeling of the alternative final cover to establish ranges of acceptable soil properties, and the total thickness of the alternative final cover.

Results of these studies and design details regarding the proposed alternative final cover are included in the Discharger’s *Engineered Alternative Design Report*.

72. The proposed engineered alternative final cover for the remainder of Module M-1 is a six-foot thick ET cover using onsite soils meeting design specifications and that are compacted to between 75 and 90 percent of standard proctor (ASTM D698). High compaction is not desirable since it reduces moisture storage capacity and root penetration. Onsite soil types potentially meeting design specifications were found to be select silty sand (with a high percentage of silt), sandy silt, and sandy clay. The proposed design also includes native or naturalized vegetation selected to be low maintenance, to maximize extraction of moisture at all depths during the growing season, and to persist after establishment without being subject to plant community shifts. Vegetation is also selected as a mixture of annuals and perennials, and to have varying rooting depths. Selected final cover vegetation included coyote bush, purple needle grass, blue wildrye, western yarrow, arroyo lupin, and gumplant. Final vegetation

design may be adjusted based on the performance of field vegetation test plots yet to be conducted.

73. Computer modeling of the proposed final cover was performed using UNSAT-H, a one-dimensional unsaturated flow and energy balance model that is commonly used in the landfill industry. To be conservative, modeling was conducted using the properties of acceptable soil from the borrow source investigation that had the lowest moisture holding capacity. The model was calibrated by comparing its predictions with the results of the ACAP study, and was tested for sensitivity by varying the input parameters. The model was run with the rainfall input data from the 1982 to 2005 time period, and sparse vegetation was assumed. The model results indicated an average of 1.6 mm/year of drainage through the cover.
74. Advantages of an evapotranspirative final cover over a prescriptive clay cover were summarized by the Discharger.

An evapotranspirative final cover:

- a. Provides an equivalent or higher degree of groundwater protection since the prescriptive clay cover is often subject to desiccation cracking that can increase permeability several orders of magnitude.
 - b. Eliminates the need to import low permeability soils for admixing with onsite soils for the low permeability clay layer.
 - c. Can be constructed by operations personnel using onsite equipment.
 - d. Can be more easily repaired than a prescriptive clay cover or a cover containing a geomembrane layer.
 - e. Provides improved stability compared with multilayer covers that are susceptible to sliding along the interfaces.
 - f. Is more permeable to landfill gas, reducing the potential for landfill gas impacts to groundwater.
 - g. Provides a better long-term final cover compared with clay (desiccation) or geomembranes (previously required final cover for Module M-1) that will eventually degrade.
75. The Discharger has adequately demonstrated that the proposed engineered alternative liner final cover is consistent with the performance goal for final covers given in Title 27 because it will minimize percolation, and it will provide protection against water quality impairment equivalent to or better than the prescriptive standard. The Discharger has also adequately demonstrated that the prescriptive cover would be unreasonably and unnecessarily burdensome and would cost substantially more than the proposed

alternative. This Order approves the use of the proposed alternative final cover for the unlined Module M-1. This Order continues to approve the use of the previously approved composite final cover for Module M-1 in the event that the alternative cover does not perform as anticipated or cannot be constructed as envisioned.

76. Final grades necessary to begin closure of Module M-1 have been reached with the exception of some low areas that need fill to achieve the required 3% slope for drainage. The Discharger periodically places waste on the top-deck of the Module M-1 to fill in the low areas. The final grade upon closure will be 325 feet MSL at the crown down to 120 feet MSL at the toe.
77. The Discharger submitted an updated Partial Final Closure Plan for closure of the southern slopes of Module M-1 with an evapotranspirative cover in August 2013. Closure of these areas was planned in three phases. Currently, two phases of the final evapotranspirative cover system have been installed on the southern slopes. Monitoring devices are installed within the Phase 2 cover area to assess the performance of the evapotranspirative cover. This Order requires the last portion of the south slope final evapotranspirative cover to be installed on southern slopes of Module M-1 by 2018, as detailed in Closure and Post-Closure Maintenance Specification E.3. The eastern side-slopes of Module M-1 to be overlain with the base liner systems of future Modules M-8, M-9, and M-11 shall be maintained with a minimum of 12-inch thick of intermediate cover until the future modules are constructed, as detailed in Construction Specification D.3. This Order requires the Discharger to provide documentation that the eastern slopes of Module M-1 are a minimum of 12-inches thick, as detailed in Provision H.9.
78. Following completion of Phase 3, the remaining area of Module M-1 to be closed includes the approximately 54 acre top-deck. The Discharger reports that this area continues to settle 1 to 2 feet a year. Currently, the top-deck area is covered with a minimum 12-inch thick interim cover. The Discharger proposes to continue to place waste in Module M-1 to bring Module M-1 to final grades and then close Module M-1. This Order requires the Discharger to close Module M-1 by 2026, as detailed in Closure and Post-Closure Maintenance Specification E.3.
79. The Discharger is required to submit an updated Partial Final Closure and Post-Closure Maintenance Plan for review and approval that meets the requirements of Title 27 and this Order prior to closure of the top-deck of Module M-1.

LANDFILL CLOSURE

80. Title 27, section 21090 provides the minimum prescriptive final cover components for landfills consisting of, in descending order, the following layers:
 - a. One-foot soil erosion resistant/vegetative layer.
 - b. Geomembrane layer (this layer is required for composite-lined landfills for equivalency to bottom liner).

- c. One-foot soil low flow-hydraulic conductivity layer, less than 1×10^{-6} cm/s or equal to the hydraulic conductivity of any bottom liner system.
- d. Two-foot soil foundation layer.

81. Title 27 allows engineered alternative final covers provided the alternative design will provide a correspondingly low flow-through rate throughout the post-closure maintenance period.
82. The Discharger submitted an April 2013 *Preliminary Closure and Postclosure Maintenance Plan* (PCPCMP) for closure and post-closure maintenance of Landfill Units 1 and 2 at the facility. The composite final cover design proposed in the PCPCMP was approved in previous WDRs Order Nos. 99-053, R5-2002-0187, and R5-2007-0107. With the approval of an evapotranspirative cover for the remainder of unlined Module M-1, the composite final cover will not be used for Module M-1 unless the evapotranspirative cover does not function as anticipated or cannot be constructed as envisioned. The composite final cover design will be used for all composite-lined modules. The composite final cover design is as follows:

Side Slopes:

- minimum one-foot vegetative cover soil
- one-foot wide geocomposite drain strips placed on five-foot centers
- 60 mil HDPE geomembrane (double textured)
- GCL ($k \leq 1 \times 10^{-9}$ cm/sec) or minimum one-foot thick clay layer ($k \leq 1 \times 10^{-6}$ cm/sec)
- a minimum two-foot thick soil foundation layer (one foot of which will be intermediate cover)

Top Deck:

- minimum one-foot vegetative cover soil
- 60 mil HDPE geomembrane (double textured)
- GCL ($k \leq 1 \times 10^{-9}$ cm/sec) or minimum one-foot thick clay layer ($k \leq 1 \times 10^{-6}$ cm/sec)
- a minimum two-foot thick soil foundation layer (one foot of which will be intermediate cover)

83. The approved composite final cover system includes a GCL in place of a one-foot thick clay layer with ($k \leq 1 \times 10^{-6}$ cm/sec). This Engineered Alternative was approved because of the lack of on-site clay as detailed in Finding 61 for the base liner system. The Discharger has demonstrated that the engineered alternative final cover meets the performance goals of Title 27 and that it is equivalent to the prescriptive standard.
84. The top deck will be sloped at 3% for adequate drainage. Perimeter slopes in the existing landfill area will be no greater than 3:1 (horizontal-to-vertical) in M-1, 4:1 in M-1L, and the final slopes in the expansion area will range from 4:1 to 5:1 to provide visual relief. One 15-foot wide bench will be constructed at least every 50 vertical feet as required by Title 27.
85. Permanent excavation and landfill slopes have a minimum safety factor of 1.6 and 1.5, respectively. The landfill cover will have a safety factor of 1.3 under saturated

conditions and 1.7 under unsaturated conditions. Since the facility is not near any known active faults, the Discharger assumed low seismic activity for the purposes of landfill cover slope stability calculations, estimating a displacement from a maximum probable earthquake of less than one foot. The Discharger's static and dynamic stability analysis demonstrates that the side slopes of the final cover will be stable in accordance with the requirements of Title 27.

86. The Discharger estimates to begin closure of the western slopes of Modules M-1L and M-2 approximately 2 years following closure of Module M-1 (approximately 2028). Closure is dependent on a number of factors such as waste streams. The closure schedule for Modules M-1L and M-2 are only estimates that may change if the estimated waste streams are higher or lower than expected.
87. The Discharger is required to submit a Partial Final Closure and Post-Closure Maintenance Plan for review and approval that meets the requirements of Title 27 and this Order prior to each phase of closure of Module M-1L and Landfill Unit 2.
88. The Discharger is collecting monitoring data from the existing Module M-1 final evapotranspirative cover to evaluate whether a 6-foot thick evapotranspirative cover could be utilized over the composite lined areas of the landfill. The Discharger shall submit an *Engineered Alternative Design Report* detailing how the evapotranspirative cover meets Title 27 requirements with an updated ROWD for Board approval prior to implementation.
89. Pursuant to Title 27, section 21090(e)(1), this Order requires a survey of the final cover following closure activities for later comparison with iso-settlement surveys required to be conducted every five years.
90. This Order approves the proposed final cover(s) and requires that a final closure and post-closure maintenance plan, design documents, and CQA plan be submitted for review and approval at least 180 days prior to actual closure.

LANDFILL POST-CLOSURE MAINTENANCE

91. The Discharger submitted an April 2013 *Preliminary Closure and Postclosure Maintenance Plan* for closure and post-closure maintenance of Landfill Units 1 and 2. The plan includes inspection, maintenance, and monitoring of the landfill during the post-closure maintenance period, and includes a post-closure maintenance cost estimate for the entire facility. Inspection and maintenance will include the condition of the final cover, drainage features, LCRS, groundwater monitoring wells, unsaturated zone monitoring points, access roads, landfill gas system, groundwater corrective action system, and site security. The plan will be implemented for a minimum period of 30 years or until the waste no longer poses a threat to environmental quality, whichever is greater.

92. The Discharger submitted a December 2003 update of the JTD that included a Partial Final Closure and Post-Closure Maintenance Plan (PFCPMP) for portions of Module M-1 anticipated at that time to occur between 2006 and 2010. The PFCPMP includes, among other things, procedures and plans for inspection, monitoring, and maintenance of the closed landfill. Subsequently, in August 2013 the Discharger submitted a Partial Final Closure Plan for the Module M-1 southern side slope evapotranspirative cover design. This Order requires the Discharger to submit a PFCPMP for the Module M-1 evapotranspirative cover system for the areas that are not previously approved. This Order also requires the Discharger to inspect, monitor, and maintain the closed portions of the landfill in accordance with the applicable PFCPMP.
93. The Discharger's *Engineered Alternative Design Report* referred to in Finding 69 of this Order includes a Post-Construction Monitoring and Maintenance Program for monitoring and maintenance of the evapotranspirative final cover proposed for Module M-1. Briefly, the monitoring program will include inspection after extreme rainfall events, frequent vegetation monitoring during the first year and less frequent during the following two years. Monitoring will also include verification of the function of the cover using moisture sensors to support future regulatory approval of the use of the alternative cover in lined areas of the landfill. Maintenance will include control of invasive weeds, replanting of seeds or shrubs as needed, removal of dead shrubs as needed, repair of localized erosion, and corrective action for any areas of vegetation that are being affected by landfill gas. This Order requires the Discharger to monitor and maintain the vegetation for the evapotranspirative final cover in accordance with the proposed Post-Construction Monitoring and Maintenance Program, which will become part of the PFCPMP.
94. Once every five years during the post-closure maintenance period, aerial photographic maps of the closed landfill area will be made to identify and evaluate landfill settlement. Iso-settlement maps will be prepared to determine the amount of differential settlement occurring over the previous five years. Pursuant to Title 27, section 21090(e)(2), this Order requires iso-settlement maps to be prepared and submitted every five years.
95. The completed final cover will be periodically tested for damage or defects by monitoring surface emissions pursuant to California Code of Regulations, title 17, section 95471(c) and Title 27, section 21090(a)(4)(A). Defects will be repaired and tested for adequacy based on the closure CQA Plan.

FINANCIAL ASSURANCES

96. Title 27, sections 21820 and 22206 require a cost estimate for landfill closure. The cost estimate must be equal to the cost of closing the landfill at the point in its active life when the extent and manner of operation would make closure the most expensive. When closing units in phases, the estimate may account for closing only the maximum area or unit of a landfill open at any time. The Discharger's 22 September 2015 *JTD* includes a closure fund estimate. The lump sum estimate is for the cost to close largest future area needing closure at any one time. The total amount of the closure cost estimate in 2015

dollars is \$23,668,833 million. This Order requires that the Discharger maintain financial assurance with the California Department of Resources Recycling and Recovery (CalRecycle) in at least the amount of the closure cost estimate. As of 2015, the balance of the closure fund was \$17,242,104 million.

97. Title 27, sections 21840 and 22211 requires a cost estimate for landfill post-closure maintenance. The Discharger's April 2013 *Preliminary Closure and Post Closure Maintenance Plan* includes a cost estimate for landfill post-closure maintenance. The amount of the cost estimate for post-closure maintenance in 2015 dollars is \$27 million over 30 years. This Order requires that the Discharger maintain financial assurance with CalRecycle in at least the amount of the post-closure maintenance cost estimate adjusted annually for inflation. As of 2015, the Discharger has established a pledge of revenue for the post-closure maintenance fund to be utilized during the post-closure period.
98. Title 27, section 22221 requires a cost estimate for corrective action of all known or reasonably foreseeable releases. The Discharger submitted a September 2012 cost estimate of \$707,749 annually for corrective action of all known or reasonably foreseeable releases. This Order requires that the Discharger maintain financial assurance with the CalRecycle in at least the amount of the cost estimate adjusted annually for inflation. The inflated amount is \$782,981 in 2015 dollars. As of 2015, the Discharger has established a pledge of revenue for the annual cost of the corrective action costs.
99. Title 27 section 22100(b) requires owners and operators of disposal facilities that are required to be permitted as solid waste landfills to provide cost estimates for initiating and completing corrective action for known or reasonably foreseeable releases of waste. Title 27 section 22101 requires submittal of a *Water Release Corrective Action Estimate* and a *Non-Water Release Corrective Action Cost Estimate*. The *Water Release Corrective Action Estimate* is for scenarios where there is statistically significant evidence of a release of waste to ground or surface water when comparing point-of-compliance analyte concentrations to background concentrations. The *Non-Water Release Corrective Action Cost Estimate* is for complete replacement of the landfill final cover system, however a site-specific corrective action plan pursuant to Title 27 section 22101(b)(2) may be provided in lieu of the final cover replacement cost estimate. Title 27 section 22221 requires establishment of financial assurances in the amount of an approved *Water Release Corrective Action Estimate* or an approved *Non-Water Release Corrective Action Cost Estimate*, whichever is greater. The Discharger's *Water Release Corrective Action Estimate* is the greater cost estimate. As detailed in Finding 98, the Discharger has established a pledge of revenue for the annual cost of the water release corrective action costs.

CEQA AND OTHER CONSIDERATIONS

100. The action to revise waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resource Code section 21000, et seq., and the CEQA guidelines, in accordance with Title 14, section 15301.
101. The Discharger prepared a final environmental impact report (EIR) for the proposed expansion in December 1994. The EIR identified significant environmental impacts associated with the landfill expansion project and included a site mitigation plan for each significant impact. The County Board of Supervisors (Supervisors) did not certify the EIR at that time, however, because it did not include project alternatives. After public hearings, the Supervisors appointed an advisory committee to develop alternatives for the project. The alternatives were presented in an August 1998 Supplemental EIR. On 22 October 1998, the Supervisors certified the EIR and Supplemental EIR for the landfill expansion as adequate and complete, and on 10 November 1998, finalized approval of the project.
102. This Order implements:
- a. *The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition*;
 - b. The prescriptive standards and performance goals of California Code of Regulations, title 27, section 20005 et seq., effective 18 July 1997, and subsequent revisions;
 - c. State Water Board Resolution 93-62, *Policy for Regulation of Discharges of Municipal Solid Waste*, adopted 17 June 1993, and revised on 21 July 2005.
 - d. The applicable provisions of Title 40 C.F.R. section 258 "Subtitle D" federal regulations as required by State Water Board Resolution 93-62.
103. Based on the threat and complexity of the discharge, the facility is determined to be classified 1-A as defined below:
- a. Category 1 threat to water quality, defined as, "Those discharges of waste that could cause the long-term loss of a designated beneficial use of the receiving water. Examples of long-term loss of a beneficial use include the loss of drinking water supply, the closure of an area used for water contact recreation, or the posting of an area used for spawning or growth of aquatic resources, including shellfish and migratory fish."
 - b. Category A complexity, defined as, "Any discharge or toxic wastes; any small volume discharge containing toxic waste; any facility having numerous discharge points and groundwater monitoring; or any Class 1 waste management unit."

104. The *Statement of Policy With Respect to Maintaining High Quality of Waters in California*, SWRCB Order WQ 68-16 (hereinafter "Anti-Degradation Policy") was adopted by the State Water Board in October 1968. Anti-Degradation Policy limits the Board's discretion to authorize the degradation of "high-quality waters." This policy has been incorporated into the Board's Basin Plans. "High-quality waters" are defined as those waters where water quality is more than sufficient to support beneficial uses designated in the Board's Basin Plan. Whether or not a water is a high-quality water is established on a constituent-by-constituent basis, which means that an aquifer can be considered a high-quality water with respect to one constituent, but not for others. (SWRCB Order No. WQ 91-10.)
105. Anti-Degradation Policy applies when an activity discharges to high quality waters and will result in some degradation of such high quality waters. When it applies, the Policy requires that WDRs reflect best practicable treatment or control (BPTC) of wastes and that any degradation of high quality waters (a) will be consistent with the maximum benefit to the people of the State, and (b) will not result in an exceedance of water quality objectives. If the activity will not result in the degradation of high quality waters, Anti-Degradation Policy does not apply, and the Discharger need only demonstrate that it will use "best efforts" to control the discharge of waste.
106. Anti-Degradation Policy does not apply to the discharge of waste to Kiefer Landfill. The requirements of this Order are designed to ensure that any such wastes remain contained at the facility and will not reach waters of the State. The requirements of this Order reflect the Discharger's best efforts to control such wastes.
107. Anti-Degradation Policy applies to the discharge of extracted groundwater to an infiltration basin, and the requirements of this Order satisfy Anti-Degradation Policy. Under the requirements of this Order, the Discharger shall demonstrate that the extracted groundwater and proposed treatment methods, if any, shall not cause degradation to the groundwater prior to its discharge to the infiltration basin. Currently, air stripping treatment methods are utilized to treat extracted groundwater and the Discharger is required to demonstrate the effectiveness of future treatment methods prior to implementing a new treatment method. These measures reflect BPTC of wastes and are designed to ensure that operation of the facility will not result in an exceedance of water quality objectives. Further, although degradation is unlikely, any degradation of waters of the State that may occur is consistent with the maximum benefit to the people of the State. During the current state of drought, recharge of recycled water for later beneficial use is consistent with conservation of all available water supplies.
108. Water Code section 13267(b) provides that: "In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of having discharge or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged

or discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.”

109. The technical reports required by this Order and the attached "Monitoring and Reporting Program R5-2016-0013" are necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

PROCEDURAL REQUIREMENTS

110. All local agencies with jurisdiction to regulate land use, solid waste disposal, air pollution, and to protect public health have approved the use of this site for the discharges of waste to land stated herein.
111. The Central Valley Water Board notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge, and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
112. The Central Valley Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.
113. Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

IT IS HEREBY ORDERED, pursuant to California Water Code sections 13263 and 13267, that Order R5-2007-0107 is rescinded except for purposes of enforcement, and that the County of Sacramento, Municipal Services Agency, Department of Waste Management and Recycling, its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and the regulations adopted thereunder, shall comply with the following:

A. PROHIBITIONS

1. The discharge of 'hazardous waste' or 'designated waste' is prohibited. For the purposes of this Order, the term 'hazardous waste' is as defined in California Code of Regulations, Title 23, section 2510 et seq., and 'designated waste' is as defined in Title 27.
2. The disposal of containerized liquids at this facility is prohibited.
3. The discharge of waste within 50 feet of surface waters is prohibited.
4. The disposal of wastes containing greater than one percent (>1%) friable asbestos is prohibited.
5. The Discharger shall comply with all Standard Prohibitions listed in Section C of the Standard Provisions and Reporting Requirements (SPRRs) dated December 2015 which are attached hereto and made part of this Order by reference.

B. DISCHARGE SPECIFICATIONS

1. The Discharger shall only discharge the following wastes:
 - a. Nonhazardous solid waste, including municipal solid waste.
 - b. Special wastes including treated infectious wastes, triple-rinsed empty pesticide containers, non-friable asbestos, and dead animal carcasses using special disposal and handling procedures.
 - c. Publicly Owned Treatment Works (POTW) grit and screenings, and biosolids with a minimum 20 percent solids and no free moisture. Biosolids are only accepted from the Sacramento Regional Wastewater Treatment Plant on an infrequent, emergency basis.
 - d. Construction and demolition debris.
 - e. Treated wood waste.
2. Nonhazardous wastes shall be discharged to either:

- a. To existing unlined Module M-1 (*existing MSWLF unit* as defined in 40 CFR 258.2) until Module M-1 is closed; or
 - b. To a Unit equipped with a composite liner containment system which meets the requirements for both liners and leachate collection and removal systems specified under D. Construction Specifications.
3. The Discharger shall discharge special wastes and POTW grit and screenings only to landfill units equipped with a composite liner system and a leachate collection and removal system (i.e., Modules M-1L, M-2, M-3, and future modules listed in Finding 6 of this Order).
4. The Discharger shall discharge treated wood wastes only to landfill units equipped with a composite liner system and a leachate collection and removal system (i.e., Modules M-1L, M-2, M-3, and future modules listed in Finding 6 of this Order). If a verified release is detected from the waste management unit where treated wood is disposed, the disposal of treated wood shall be terminated at the unit with the verified release until corrective action ceases the release.
5. The Discharger shall manage treated wood waste in accordance with California Health and Safety Code sections 25143.1.5 and 250150.7 and shall comply with all prohibitions listed in Title 22, section 67386.3.
6. The Discharger shall use the following materials for ADC: temporary geosynthetic tarps, degradable geosynthetic covers, processed green materials, compost materials, processed construction and demolition wastes and materials, shredded tires (mixed with soil), and wood ash (non-hazardous, non-designated ash from wood-fired energy generation facilities).
7. This Order allows any ADC proposed for use at the facility after the adoption of this Order to be approved by Central Valley Water Board staff provided the Discharger has demonstrated it meets the requirements in Title 27, section 20705. The approved ADC materials should then be listed in the facility's WDRs during the next regular update or revision with information about the Discharger's demonstration. This Order also includes a requirement that ADC only be used in internal areas of the landfill unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality. The demonstration can take sedimentation basins into account.
8. The Discharger shall use approved ADC only in internal areas of the landfill that do not drain outside of the limits of the contiguous landfill units unless the Discharger demonstrates that runoff from the particular ADC is not a threat to surface water quality and the demonstration has been approved. This demonstration may take removal of sediment or suspended solids into account for landfills where surface water drains to a sedimentation basin.

9. The Discharger shall, in a timely manner, remove and relocate any wastes discharged at this facility in violation of this Order. If the Discharger is unable to remove and relocate the waste, the Discharger shall submit a report to the Central Valley Water Board explaining how the discharge occurred, why the waste cannot be removed, and any updates to the waste acceptance program necessary to prevent re-occurrence. If the waste is a hazardous waste, the Discharger shall immediately notify the Department of Toxic Substances Control.
10. The Discharger may inject limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing the remaining VOCs concentrations in groundwater following obtaining coverage under the General Order for In-Situ Groundwater Remediation R5-2008-0149.
11. Leachate and/or landfill gas condensate may be used as dust control or returned only to Modules M-1L, M-2, M-3, and future composite lined modules listed in Finding 6 of this Order in accordance with Standard Discharge Specifications D.2 through D.4 of the SPRRs. Leachate used as dust control shall be contained within composite lined modules in areas with no public access and shall not be allowed to commingle with storm water runoff or enter the storm water system. Leachate and gas condensate shall not be used as dust control on or returned to unlined Module M-1.
12. The Discharger shall comply with all Standard Discharge Specifications listed in Section D of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

Infiltration Basins

13. The Discharger may discharge extracted groundwater to designated on-site infiltration basins to potentially reduce the carbon footprint of the groundwater treatment system and provide a beneficial re-use of groundwater through aquifer recharge following written Executive Officer approval. A minimum of 90-days prior to the discharge of groundwater to the infiltration basin, the Discharger shall submit a Discharge Basin Pilot Study Work Plan for written Executive Officer approval that includes the following:
 - a. Characterization of groundwater to be discharged to the infiltration basin including estimated volume and analysis of potential COCs, including, but not limited to VOCs, lead, selenium, chlorine, and manganese.
 - b. Evaluation showing that the discharge of treated groundwater will not impact groundwater or surface water.
 - c. Water Balance Model of the infiltration basin showing that the basin can contain the 25-year, 24-hour storm event including associated calculations.
 - d. Monitoring systems including, but not limited to:

- 1) Influent monitoring
- 2) Groundwater monitoring
- 3) Surface water monitoring
- 4) Freeboard monitoring

14. Only extracted groundwater with individual VOC concentrations less than 0.5 µg/L may be discharged into an infiltration basin.
15. Use of the infiltration basins shall not result in odor or vector nuisance conditions and shall not result in the degradation of underlying groundwater.

C. FACILITY SPECIFICATIONS

1. Surface drainage within the waste management facility shall either be contained on-site or be discharged in accordance with applicable storm water regulations.
2. The Discharger shall comply with all Standard Facility Specifications listed in Section E of the SPRRs dated December 2015 which are part of this Order.

Infiltration Basins

3. Infiltration basins shall have capacity for extracted groundwater flows to the infiltration basins, precipitation, and precipitation runoff from a 25-year, 24-hour storm event and shall maintain at least two (2.0) feet of freeboard at all times.
4. The Discharger shall **immediately** notify Central Valley Water Board staff by telephone and email and **immediately** take measures to regain infiltration basin capacity in the event that freeboard levels are equal to or less than 2.0 feet.
5. The infiltration basins shall be designed, constructed and maintained to prevent scouring and/or erosion of the containment features at points of discharge to the impoundments and by wave action at the water line.
6. Solids that accumulate in the infiltration basins shall be periodically removed to maintain minimum freeboard requirements and to maintain sufficient capacity for discharge of extracted groundwater. Prior to removal of these solids, samples shall be collected for their characterization and classification for disposal at an appropriate facility.

D. CONSTRUCTION SPECIFICATIONS

1. The Discharger shall construct the base liner and side slope liner of new Class III landfill units as described in Finding 6 of this Order in accordance with the following approved engineered alternative liner design:

- a. An engineered alternative composite **base liner system** that is comprised, from bottom to top, of the following:

Secondary Liner System

- 1) a compositely lined sump
- 2) geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- 3) 60-mil HDPE geomembrane (bottom side textured)
- 4) one-foot gravel drainage layer ($k \geq 0.1$ cm/sec), or a geosynthetic drainage layer

Primary Liner System

- 1) a compositely lined sump
- 2) geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- 3) 60-mil HDPE geomembrane (bottom side textured)
- 4) one-foot gravel drainage layer ($k \geq 0.1$ cm/sec)
- 5) nonwoven geotextile filter fabric (minimum eight oz. per square yard)
- 6) minimum one-foot thick operations layer

- b. An engineered alternative composite **side slope liner system** that is comprised, in ascending order, of the following:

- 1) geosynthetic clay liner ($k \leq 5 \times 10^{-9}$ cm/sec)
- 2) 60-mil HDPE geomembrane (bottom side textured)
- 3) minimum two-foot sand operations layer/drainage layer ($k \geq 1 \times 10^{-3}$ cm/sec)

2. The entire length of new Class III landfill unit slopes that connect to unlined Module M-1 shall be lined with the approved side-slope liner system detailed in Construction Specification D.1.

3. The eastern slopes of Module M-1 shall be maintained with a minimum 12-inch thick intermediate cover in accordance with Title 27 20700 until the base liner systems for adjacent Modules M-8, M-9, and M-11 are constructed on the eastern slope of Module M-1. As detailed in Provision H.9, the Discharger shall provide documentation that the intermediate cover on the eastern slope of Module M-1 meets these requirements.
4. The Discharger shall not proceed with liner construction (other than earth moving and grading in preparation for liner construction) until the construction plans, specifications, and all applicable construction quality assurance plans have been approved by Board staff.
5. The Discharger may propose changes to the liner system design prior to construction, provided that approved components are not eliminated, the engineering properties of the components are not substantially reduced, and the proposed liner system results in the protection of water quality equal to or greater than the design prescribed by Title 27 and this Order. The proposed changes may be made following written approval by the Executive Officer. Substantive changes to the design require reevaluation as an engineered alternative and approval by the Central Valley Water Board in revised WDRs.
6. The Discharger shall comply with all Standard Construction Specifications listed in Section F of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
7. The Discharger shall comply with all Storm Water Provisions listed in Section L of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

E. CLOSURE AND POST-CLOSURE MAINTENANCE SPECIFICATIONS

1. The Discharger shall submit a final or partial final closure and post-closure maintenance plan at least two years prior to proposed closure of any portion of the landfill in accordance with requirements in Section G of the Standard Closure and Post-Closure Specifications in the SPRRs.
2. At closure, the remaining unclosed portion of Module M-1 shall receive an evapotranspirative final cover generally meeting the proposed specifications in the Discharger's January 2007 Engineered Alternative Design Report and as described in Finding 69 through 75 of this Order. At a minimum, the final cover shall consist of at least six feet of soil and vegetation. The final design shall be submitted in a Partial Final Closure and Post-Closure Maintenance Plan at least 120 days prior to planned construction, and the cover shall meet the specifications of the approved final design. Final cover designs shall be supported by a slope stability analysis as required by Title 27. Module M-1 may receive the composite final cover described in Closure And Post-Closure Maintenance Specification E.4 in the event that the alternative cover

does not function as anticipated or cannot be constructed as envisioned. The Discharger shall not proceed with closure construction (other than earth moving and grading in preparation for liner construction) until the construction plans, specifications, and all applicable construction quality assurance plans have been approved by Board staff.

3. As detailed in Finding 76, the final grades for Module M-1 have been reached with the exception of some low areas on the top-deck. The Discharger shall close Module M-1 in accordance with the following schedule:

<u>Module M-1 Area</u>	<u>Closure Schedule</u>
Southern Side Slopes	Complete Closure by 2018
Top-Deck	Begin Closure no later than 2020 and Complete Closure by 2026

4. At closure, landfill Modules M-1L and M-2 through M-11 shall receive a composite final cover in accordance with the prescriptive standards of Subtitle D and Title 27, or the engineered alternative composite design described in Finding 82 of this Order and listed below:

Side Slopes:

- minimum one-foot vegetative cover soil
- one-foot wide geocomposite drain strips placed on five-foot centers
- 60 mil HDPE geomembrane (double textured)
- GCL ($k \leq 1 \times 10^{-9}$ cm/sec) or minimum one-foot thick clay layer ($k \leq 1 \times 10^{-6}$ cm/sec)
- a minimum two-foot thick soil foundation layer (one foot of which will be intermediate cover)

Top Deck:

- minimum one-foot vegetative cover soil
- 60 mil HDPE geomembrane (double textured)
- GCL ($k \leq 1 \times 10^{-9}$ cm/sec) or minimum one-foot thick clay layer ($k \leq 1 \times 10^{-6}$ cm/sec)
- a minimum two-foot thick soil foundation layer (one foot of which will be intermediate cover)

Final cover designs shall be supported by a slope stability analysis as required by Title 27.

5. The Discharger may not close the landfill Modules M-1L and M-2 with a minimum 6-foot thick evapotranspirative cover until the Discharger can show that the evapotranspirative cover meets the requirements of Title 27 and new WDRs are issued.
6. The Discharger shall obtain revised WDRs prior to closure with any other final cover design than the design or designs approved in this Order, except when modifications are necessary for problematic areas of the final cover needing repair so long as the

barrier layer (e.g., geomembrane, GCL, and/or compacted clay layer) remains intact, and the modifications are approved by Central Valley Water Board staff.

7. The Discharger shall close the landfill with side slopes at steepness of 3H:1V or less, and top deck areas shall be sloped at three percent or greater.
8. The Discharger shall install an active landfill gas extraction system for the closed landfill unit during landfill closure, and landfill gas shall be extracted from closed landfill units until such time that the landfill gas is no longer a threat to water quality as documented by the Discharger and approved by the Executive Officer.
9. For closure with a final cover that includes a geomembrane, the Discharger shall seal the edges of the final cover by connecting the cover geomembrane to the liner geomembrane.
10. The Discharger shall test the critical interfaces of the final cover in a laboratory to ensure minimum design shear strengths are achieved and include the results in the final documentation report.
11. The Discharger shall ensure that the vegetative/erosion resistant layer receives necessary seed, binder, and nutrients to establish the vegetation proposed in the final closure plan. The Discharger shall install necessary erosion and sedimentation controls to prevent erosion and sediment in runoff from the closed landfill during the period the vegetation is being established.
12. The Discharger shall inspect, monitor, and maintain closed landfill units in accordance with the applicable Partial Final Post-Closure Maintenance Plan or Final Post-Closure Maintenance Plan.
13. The Discharger shall monitor and maintain the vegetation for the evapotranspirative final cover in accordance with the Post-Construction Monitoring and Maintenance Program in the Discharger's January 2007 *Engineered Alternative Design Report* or an approved Partial Final Post-Closure Maintenance Plan.
14. The Discharger shall comply with all Standard Closure and Post-Closure Specifications listed in Section G and all Standard Construction Specifications that are applicable to closure in Section F of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

Infiltration Basins

15. At closure of the infiltration basins, the Discharger shall clean-close the infiltration basins. All residual wastes, including liquids, sludges, precipitates, settled solids, liner materials and adjacent natural geological materials contaminated by wastes shall be completely removed and discharged to an appropriately permitted landfill facility. If after reasonable attempts to remove contaminated natural geologic materials, the

Discharger demonstrates that removal of all remaining contamination is infeasible, then the units shall be closed as a landfill. In this event, the Discharger shall backfill and grade the area and submit a revised Final Closure and Post-Closure Maintenance Plan proposing a final cover meeting the requirements of Title 27 section 21090 and shall perform all post-closure maintenance in the approved Post-Closure Maintenance Plan.

16. The Discharger shall submit a work plan for clean-closure of the infiltration basins a minimum of 90 days prior to the proposed work for written Executive Officer approval.

F. FINANCIAL ASSURANCE SPECIFICATIONS

1. The Discharger shall obtain and maintain assurances of financial responsibility with CalRecycle for closure and post-closure maintenance for the landfill in at least the amounts described in Findings 96 and 97, adjusted for inflation annually. A report regarding financial assurances for closure and post-closure maintenance shall be submitted to the Central Valley Water Board by **15 August of each year**. This may be the same report that is submitted to CalRecycle for this purpose. If CalRecycle determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism to CalRecycle and the Central Valley Water Board for at least the amount of the approved cost estimate.
2. The Discharger shall update the preliminary closure and post-closure maintenance plan (PCPCMP) any time there is a change that will increase the amount of the closure and/or post-closure maintenance cost estimate. The updated PCPCMP shall be submitted to the Central Valley Water Board, the Local Enforcement Agency, and CalRecycle. The PCPCMP shall meet the requirements of Title 27, section 21769(b), and include a lump sum estimate of the cost of carrying out all actions necessary to close each Unit, to prepare detailed design specifications, to develop the final closure and post-closure maintenance plan, and to carry out the first thirty years of post-closure maintenance. Reports regarding financial assurance required in F.1 above shall reflect the updated cost estimate.
3. The Discharger shall obtain and maintain assurances of financial responsibility with CalRecycle for initiating and completing corrective action for all known or reasonably foreseeable releases from the landfill in at least the amount of the annual inflation-adjusted cost estimate described in Finding 98. A report regarding financial assurances for corrective action shall be submitted to the Central Valley Water Board by **15 August of each year**. This may be the same report that is submitted to CalRecycle for this purpose. If CalRecycle determines that either the amount of coverage or the mechanism is inadequate, then within 90 days of notification, the Discharger shall submit an acceptable mechanism to CalRecycle and the Central Valley Water Board for at least the amount of the approved cost estimate.

4. The Discharger shall comply with all Standard Financial Assurance Specifications listed in Section H of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

G. MONITORING SPECIFICATIONS

1. The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone, and in accordance with Monitoring and Reporting Program (MRP) R5-2016-0013, and the Standard Monitoring Specifications listed in Section I of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
2. The Discharger shall, for any landfill unit in a corrective action monitoring program, comply with the corrective action monitoring program provisions of Title 27, MRP R5-2016-0013, and the Standard Monitoring Specifications listed in Section I of SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
3. The Discharger shall comply with the Water Quality Protection Standard as specified in this Order, MRP R5-2016-0013, and the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
4. The concentrations of the constituents of concern in waters passing the Point of Compliance (defined pursuant to Title 27, section 20164 as a vertical surface located at the hydraulically downgradient limit of the landfill unit that extends through the uppermost aquifer underlying the unit) shall not exceed the concentration limits established pursuant to MRP R5-2016-0013.
5. For each monitoring event, the Discharger shall determine whether the landfill is in compliance with the Water Quality Protection Standard using procedures specified in MRP R5-2016-0013 and the Standard Monitoring Specifications in Section I of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.
6. As specified in MRP R5-2016-0013, the Discharger shall enter all monitoring data and monitoring reports into the online Geotracker database as required by Division 3 of Title 27 and Chapter 30, Division 3 of Title 23.
7. The Discharger shall monitor corrective action monitoring wells on a semi-annual basis, in accordance with MRP R5-2016-0013.
8. The Discharger shall comply with all Standard Monitoring Specifications and Response to a Release specifications listed in Sections I and J of the SPRRs dated December 2015 which are attached hereto and made part of this Order by reference.

H. PROVISIONS

1. The Discharger shall maintain a copy of this Order at the facility, including the MRP R5-2016-0013 and the SPRRs dated December 2015 which are part of this Order, and make it available at all times to facility operating personnel, who shall be familiar with its contents, and to regulatory agency personnel.
2. The Discharger shall comply with all applicable provisions of Title 27 and Subtitle D that are not specifically referred to in this Order.
3. The Discharger shall comply with MRP R5-2016-0013, which is incorporated into and made part of this Order by reference.
4. The Discharger shall continue to operate the corrective action groundwater extraction system until the Discharger demonstrates that the concentrations of all COCs are reduced to levels below their respective concentration limits throughout the entire zone affected by the release, per Title 27 Section 20430, and receives written authorization from the Executive Office to terminate corrective action.
5. The Discharger shall continue to operate the landfill gas extraction system until approval to discontinue operation is obtained by CalRecycle, LEA, and/or the Water Board.
6. The Discharger shall comply with the applicable portions of the Standard Provisions and Reporting Requirements for Waste Discharge Requirements for Nonhazardous Solid Waste Discharges Regulated by Subtitle D and/or Title 27, dated December 2015, which are attached hereto and made part of this Order by reference.
7. If there is any conflicting or contradictory language between the WDRs, the MRP, or the SPRRs, then language in the WDRs shall supersede either the MRP or the SPRRs, and language in the MRP shall supersede the SPRRs.
8. All reports required by this Order shall be submitted pursuant to Water Code section 13267.
9. The Discharger shall submit an *Intermediate Cover Thickness Verification Report* by **1 August 2016** documenting the Module M-1 intermediate cover thickness. The report shall include the following:
 - a. Methodology used to verify intermediate cover thickness (i.e. potholing). At a minimum, intermediate cover thickness shall be verified in a grid pattern on 300-foot centers over the eastern slopes of Module M-1. At locations, if any, where the cover is determined to be less than 12 inches, cover thickness will be re-verified using a grid pattern on 100-foot centers.”
 - b. Map showing sample locations.

- c. Table documenting sampling results.
 - d. Schedule and proposed methods to retrofit intermediate cover to maintain a minimum 12-inch thick cover, required only if the results show the intermediate cover is less than 12-inches thick.
10. By **1 June 2016**, the Discharger shall submit an updated *Sample Collection and Analysis Plan* detailing the facility sampling and analysis procedures including soil pore gas and quality assurance/quality control standards.
11. The Discharger shall complete the tasks contained in these waste discharge requirements in accordance with the following time schedule:

<u>Task</u>	<u>Compliance Date</u>
A. Construction Plans	
Submit construction and design plans for review and approval. (see all Construction Specifications in Section D, above and Section F of the SPRRs.)	90 days prior to proposed construction
B. Construction Report	
Submit a construction report for review and approval upon completion demonstrating construction was in accordance with approved construction plans (see Standard Construction Specification F.27 in the SPRRs).	60 days prior to proposed discharge
C. Final Closure Plans	
Submit a final or partial final closure and post-closure maintenance plan, design plans, and CQA plan for review and approval (see all Closure and Post-Closure Specifications in Section E, above and Section G of the SPRRs).	Two years prior to closure

12. The Discharger shall comply with all General Provisions listed in Section K of the SPRRs dated December 2015 which are part of this Order.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 19 February 2016.

ORIGINAL SIGNED BY
PAMELA C. CREEDON, Executive Officer

AAH/WMH

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2016-0013
FOR
COUNTY OF SACRAMENTO
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING
KIEFER LANDFILL, CLASS III LANDFILLS
CONSTRUCTION, OPERATION, CLOSURE,
POST-CLOSURE MAINTENANCE, AND CORRECTIVE ACTION
SACRAMENTO COUNTY

This monitoring and reporting program (MRP) is issued pursuant to California Water Code section 13267 and incorporates requirements for groundwater, surface water, and unsaturated zone monitoring and reporting; facility monitoring, maintenance, and reporting; and financial assurances reporting contained in California Code of Regulations, title 27, section 20005, et seq. (hereafter Title 27), Waste Discharge Requirements (WDRs) Order No. R5-2016-0013, and the Standard Provisions and Reporting Requirements (SPRRs) dated December 2015. Compliance with this MRP is ordered by the WDRs and the Discharger shall not implement any changes to this MRP unless a revised MRP is issued by the Central Valley Water Board or the Executive Officer.

A. MONITORING

The Discharger shall comply with the detection monitoring program provisions of Title 27 for groundwater, surface water, and the unsaturated zone in accordance with Standard Monitoring Specifications in Section I of the SPRRs and the Monitoring Specifications in Section G of the WDRs. All monitoring shall be conducted in accordance with an approved *Sample Collection and Analysis Plan*, which include quality assurance/quality control standards. The current *Sample Collection and Analysis Plan* does not include procedures for sampling and testing soil pore gas and shall be updated with this information per WDR R5-2016-0013 Provision H.9.

All compliance monitoring wells established for the detection monitoring program shall constitute the monitoring points for the groundwater Water Quality Protection Standard. All detection monitoring program groundwater monitoring wells, unsaturated zone monitoring devices, leachate, and surface water monitoring points shall be sampled and analyzed for monitoring parameters and constituents of concern (COCs) as indicated and listed in Tables I through VII.

The Discharger may use alternative analytical test methods, including new USEPA approved methods, provided the methods have method detection limits equal to or lower than the analytical methods specified in this Monitoring and Reporting Program, and are identified in the *Sample Collection and Analysis Plan*.

The monitoring program of this MRP includes:

<u>Section</u>	<u>Monitoring Program</u>
A.1	Groundwater Monitoring
A.2	Unsaturated Zone Monitoring
A.3	Leachate Monitoring, Seep Monitoring, and LCRS Testing
A.4	Surface Water Monitoring
A.5	Facility Monitoring
A.6	Corrective Action Monitoring

1. **Groundwater Monitoring**

The Discharger shall operate and maintain a groundwater detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420. The detection monitoring system shall be certified by a California-licensed professional civil engineer or geologist as meeting the requirements of Title 27. The current groundwater detection monitoring system meets the applicable requirements of Title 27. The Discharger shall revise the groundwater detection monitoring system (after review and approval by Central Valley Water Board staff) as needed each time a new landfill cell or module is constructed.

The current groundwater monitoring network consists of the following:

<u>Well</u>	<u>Status</u>	<u>Zone</u>	<u>Landfill Unit Being Monitored</u>
MW-1A	Corrective Action	A	1
MW-1B	Corrective Action	B	1
MW-2A	Corrective Action	A	1
MW-2B	Corrective Action	B	1
MW-2C	Detection	C	1
MW-2A1	Corrective Action	A	1
MW-3A	Corrective Action	A	1
MW-4A	Corrective Action	A	1
MW-4B	Corrective Action	B	1
MW-5A	Corrective Action	A	1
MW-5B	Detection	B	1
MW-6A	Corrective Action	A	1
MW-6A1	Detection	A	1
MW-6B	Detection	B	1, 2
MW-7AR	Corrective Action	A	1
MW-7B	Corrective Action	B	1
MW-9A	Corrective Action	A	1
MW-9B	Corrective Action	B	1
MW-10A	Background	A	1, 2
MW-10B	Background	B	1, 2

<u>Well</u>	<u>Status</u>	<u>Zone</u>	<u>Landfill Unit Being Monitored</u>
MW-10C	Background	C	1, 2
MW-11A	Corrective Action	A	1
MW-11B	Corrective Action	B	1
MW-12A	Detection	A	1, 2
MW-12B	Detection	B	1, 2
MW-12C	Detection	C	1, 2
MW-15A	Corrective Action	A	1, 2
MW-15B	Detection	B	2
MW-16A	Corrective Action	A	1
MW-16B	Corrective Action	A	1
MW-17A	Detection	A	2
MW-17B	Detection	B	2
MW-18A	Corrective Action	A	1
MW-19A	Corrective Action	B	1
MW-20A	Corrective Action	A	1
MW-20B	Corrective Action	B	1
MW-20C	Detection	C	1
MW-21A	Corrective Action	A	1
MW-21B	Corrective Action	B	1
MW-22A	Corrective Action	A	1
MW-22B	Detection	B	1
MW-23A	Corrective Action	A	1
MW-23B	Detection	B	1, 2
MW-24A	Corrective Action	A	1
MW-27A	Detection	A	1, 2
MW-28A	Corrective Action	A	1
MW-29A	Corrective Action	A	1
MW-30A	Corrective Action	A	1
MW-36A	Detection	A	2
MW-37A	Corrective Action	A	1, 2
MW-37B	Corrective Action	B	1, 2
MW-37C	Detection	C	1, 2
MW-38A	Background	A	1, 2
MW-38B	Background	B	1, 2
MW-39A	Background	A	1, 2
MW-39B	Background	B	1, 2
MW-40A	Corrective Action	A	1
MW-40B	Detection	B	1, 2
MW-41A1	Corrective Action	A	1
MW-41A2	Corrective Action	A	1
MW-41B	Corrective Action	B	1
MW-42A	Detection	A	1, 2
MW-42B	Detection	B	1, 2

<u>Well</u>	<u>Status</u>	<u>Zone</u>	<u>Landfill Unit Being Monitored</u>
MW-43A	Detection	A	1, 2
Well E	Detection	C	1
MW-34A	Background - future	A	1, 2
MW-34B	Background - future	B	1, 2
MW-35A	Background - future	A	1, 2
MW-35B	Background- future	B	1, 2
MW-36B	Detection - future	B	2

Groundwater samples shall be collected from the background wells, detection monitoring wells, corrective action monitoring wells, and any additional wells added as part of the approved groundwater monitoring system. The collected samples from the background wells, detection monitoring wells, corrective action monitoring wells shall be analyzed for the parameters and constituents listed in Table I in accordance with the specified methods and frequencies. Corrective action wells may be analyzed for more constituents or more frequently as specified in Section A.6. The Discharger shall collect, preserve, and transport groundwater samples in accordance with the *Sample Collection and Analysis Plan*.

Once per quarter, the Discharger shall measure the groundwater elevation in each well, determine groundwater flow direction, and estimate groundwater flow rates in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation monitored. The results shall be reported semiannually, including the times of expected highest and lowest elevations of the water levels in the wells, pursuant to Title 27, section 20415(e)(15).

Samples collected for the COC monitoring specified in Table I shall be collected and analyzed in accordance with the methods listed in Table VII every five years. Five-year COCs were last monitored in 2015 and shall be monitored again in **2020**. The results shall be reported in the Annual Monitoring Report for the year in which the samples were collected.

2. Unsaturated Zone Monitoring

The Discharger shall operate and maintain an unsaturated zone detection monitoring system that complies with the applicable provisions of Title 27, sections 20415 and 20420, to provide the best assurance of the earliest possible detection of a release from the Units. The current unsaturated zone detection monitoring system meets the applicable requirements of Title 27. The Discharger shall install unsaturated zone monitoring devices (after review and approval by Central Valley Water Board staff) each time the landfill constructs a new cell or module.

The Discharger shall monitor the unsaturated zone monitoring points as required in part A.2 and Tables II and III of this MRP. Monitoring results for the unsaturated zone shall be included in monitoring reports and shall include an evaluation of potential impacts of the facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

The current unsaturated zone monitoring network consists of lysimeters and landfill gas monitoring probes.

a) Soil Pore Water

The current lysimeter network consists of the following:

<u>Lysimeter</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>	<u>Modules Being Monitored</u>
LYS-1U ¹	Detection	1	M-1
LYS-2U ¹	Detection	1	M-1
LYS-7U ¹	Detection	1	M-1
LYS-10U ¹	Background	2	M-7
LYS -13UN	Detection	1	M-1
LYS -13US	Detection	1	M-1
LYS -14U	Detection	1	M-1
VZ-1	Detection	1	M-1L
VZ-2	Detection	1	M-1L
VZ-3	Detection	1	M-1L
VZ-4	Detection	1	M-1L
VZ-8	Detection	1	M-1L
VZ-9	Detection	1	M-1L
LYS-M2	Detection	2	M-2
LYS-M3	Detection	2	M-3
LYS-M4	Future	2	M-4 (future)
LYS-M5	Future	2	M-5 (future)
LYS-M6	Future	2	M-6 (future)
LYS-M7	Future	2	M-7 (future)

<u>Lysimeter</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>	<u>Modules Being Monitored</u>
LYS-M8	Future	2	M-8 (future)
LYS-M9	Future	2	M-9 (future)
LYS-M10	Future	2	M-10 (future)
LYS-M11	Future	2	M-11 (future)

¹ Lysimeters in the same location as the groundwater well with the same number (e.g., LYS-1U = MW-1U)

Unsaturated zone soil pore water samples shall be collected from the monitoring network listed above and shall be analyzed for the parameters and constituents listed in Table II in accordance with the specified methods and frequencies only when liquid is present.

Pan lysimeters shall be inspected for the presence of liquid **monthly**. If liquid is detected in a previously dry pan lysimeter, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the liquid for Field and Monitoring Parameters listed in Table II. Samples collected for the 5-year COC analyses specified in Table II shall be collected and analyzed in accordance with the methods listed in Table VII every five years, beginning again in **2020**.

The Discharger shall collect, preserve, and transport samples in accordance with the quality assurance/quality control standards contained in the *Sample Collection and Analysis Plan*.

b) Soil Pore Gas

The current landfill gas monitoring well network consists of the following:

<u>Gas Monitoring Well</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>
GP-1A	Detection, Soil-Pore Gas	1
GP-2A	Detection	1
GP-3A	Detection	1
GP-4A	Detection	1
GP-5	Detection	1, 2
GP-6	Detection	1, 2
GP-7	Detection	2
GP-8	Detection	1, 2
GP-9	Detection	1, 2
GP-13	Detection	1, 2
GP-15	Detection	1, 2
GP-16	Detection	1, 2
GP-17	Detection	1, 2
GP-18	Detection	1, 2

<u>Gas Monitoring Well</u>	<u>Status</u>	<u>Landfill Unit Being Monitored</u>
GP-19	Detection	1
GP-20	Detection	1
GP-21	Detection	1
GP-22	Detection	1, 2
GP-23	Detection	1, 2
GP-24	Detection	1, 2
GP-25	Detection	2
GP-26	Detection	2
GP-27	Detection	2
GP-28	Detection	2
GP-29	Detection	2
GP-30	Detection	2
GP-31	Detection	2
GP-32	Detection	2
GP-33	Detection	2
GP-41	Detection	1, 2
GP-42	Detection	1, 2
GP-43	Detection	1, 2
GP-44	Detection	1, 2
GP-45	Detection	1, 2
GP-46	Detection	1, 2
GP-47	Detection	1, 2
GP-48	Detection	1, 2
GP-49	Detection	1, 2
GP-50	Detection	1, 2
GP-51	Detection	1, 2
GP-52	Detection	2
GP-53	Detection	2
GP-54	Detection	2
GP-55	Detection	2
GP-56	Detection	1, 2
GP-57	Detection	1, 2

Unsaturated zone soil pore gas samples shall be collected from the monitoring network listed above and shall be analyzed for the parameters and constituents listed in Table III in accordance with the specified methods and frequencies. The current Sample Collection and Analysis Plan does not include sampling procedures for landfill gas probes. The Discharger shall submit a Sample Collection and Analysis Plan detailing the soil pore gas sampling and analysis procedures including quality assurance/quality control standards for approval.

In the event of a shutdown of the landfill gas extraction system exceeding 24 hours, the Discharger shall notify Board staff via e-mail, fax, or telephone within 24 hours of knowledge and shall provide weekly status updates. This requirement excludes shutdown events where the landfill gas system restarts

itself or whether the system is restarted manually within 24 hours. All shutdowns exceeding 24 hours, regardless of the type of restart, shall be summarized in the semiannual reports.

Landfill gas monitoring reports shall be included with the semiannual reports and shall include an annual evaluation of potential impacts of landfill gas on the unsaturated zone beneath and adjacent to the landfill and compliance with the Water Quality Protection Standard.

3. Leachate Monitoring, Seep Monitoring, and Annual LCRS Testing

Leachate Monitoring: The Discharger shall operate and maintain leachate collection and removal system (LCRS) sumps, conduct monitoring of any detected leachate seeps, and conduct annual testing of each LCRS in accordance with Title 27 and this monitoring program.

The current LCRS leachate sump monitoring points are:

<u>Mon Pt.</u>	<u>Landfill Unit Being Monitored</u>	<u>Module Where Sump is Located</u>
Sump L-1	1	M-1L
Sump L-2	2	M-2
Sump L-3	2	M-3
Sump L-4	2	M-4 (future)
Sump L-5	2	M-5 (future)
Sump L-6	2	M-6 (future)
Sump L-7	2	M-7 (future)
Sump L-8	2	M-8 (future)
Sump L-9	2	M-9 (future)
Sump L-10	2	M-10 (future)
Sump L-11	2	M-11 (future)

All LCRS sumps shall be inspected monthly for the presence of leachate, and flow shall be recorded in accordance with Table IV. If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in Table IV. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table IV whenever liquid is present. All LCRS sump samples shall be analyzed for the 5-year COCs specified in Table IV every five years, beginning again in **2020**.

Seep Monitoring: Leachate that seeps to the surface from a landfill unit shall be sampled and analyzed for the Field and Monitoring Parameters listed in Table IV upon detection. The quantity of leachate shall be estimated and

reported as Leachate Flow Rate (in gallons/day). Reporting for leachate seeps shall be conducted as required in Section B.3 of this MRP, below.

Annual LCRS Testing: All LCRSs shall be tested annually pursuant to Title 27, section 20340(d) to demonstrate proper operation. The results of these tests shall be reported to the Central Valley Water Board in the Annual Monitoring Report and shall include comparisons with earlier tests made under comparable conditions.

4. Surface Water Monitoring

The Discharger shall operate a surface water detection monitoring system for any landfill facility where runoff from landfill areas flows or could flow to waters of the United States. The monitoring system shall comply with the applicable provisions of Title 27, sections 20415 and 20420. At the Kiefer Landfill, runoff from landfill areas flows to sedimentation basins that periodically discharge to Deer Creek. The current surface water detection monitoring system meets the applicable requirements of Title 27.

The current surface water monitoring points for the landfill are:

<u>Mon Pt.</u>	<u>Status</u>
RSW-001	Background
RSW-003	Detection, Point of Compliance
Basin A Discharge Point	Detection
Basin B Discharge Point	Detection

For surface water detection monitoring, a sample shall be collected at each monitoring point location and analyzed for the monitoring parameters and constituents in accordance with the methods and frequency specified in Table V. All surface water monitoring samples shall be collected and analyzed for the 5-year COCs specified in Table V every five years, beginning again in **2020**.

5. Facility Monitoring

a. Annual Facility Inspection

Annually, prior to the anticipated rainy season, but no later than **30 September**, the Discharger shall conduct an inspection of the facility. The inspection shall assess repair and maintenance needed for drainage control systems, cover systems, and groundwater monitoring wells; and shall assess preparedness for winter conditions (including but not limited to erosion and sedimentation control). The Discharger shall take photos of any problems areas before and after repairs. Any necessary construction, maintenance, or repairs shall be completed by **31 October**.

Annual facility inspection reporting shall be submitted as required in Section B.4 of this MRP.

b. Major Storm Events

The Discharger shall inspect all precipitation, diversion, and drainage facilities and all landfill side slopes for damage **within 7 days** following major storm events capable of causing damage or significant erosion. The Discharger shall take photos of any problems areas before and after repairs. Necessary repairs shall be completed **within 30 days** of the inspection. Notification and reporting requirements for major storm events shall be conducted as required in Section B.5 of this MRP.

c. Five-Year Iso-Settlement Survey for Closed Units

For closed landfill units, the Discharger shall conduct a five-year iso-settlement survey and produce an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's low-hydraulic-conductivity layer. For each portion of the landfill, this map shall show the total lowering of the surface elevation of the final cover, relative to the baseline topographic map [Title 27, section 21090(e)(1 & 2)]. Reporting shall be in accordance with Section B.6 of this MRP. Iso-settlement survey shall be conducted immediately following closure of each unit and every five years after.

d. Standard Observations

The Discharger shall conduct Standard Observations at the landfill in accordance with this section of the MRP. Standard observations shall be conducted in accordance with the following schedule:

<u>Landfill Unit Type</u>	<u>Frequency</u>	<u>Season</u>
Active	Weekly	Wet: 1 October to 30 April
Active	Monthly	Dry: 1 May to 30 September
Inactive/Closed	Monthly	Wet: 1 October to 30 April
Inactive/Closed	Quarterly	Dry: 1 May to 30 September

The Standard Observations shall include:

- 1) For the landfill units:
 - a) Evidence of ponded water at any point on the landfill outside of any contact storm water/leachate diversions structures on the active face (show affected area on map); and
 - b) Evidence of erosion and/or of day-lighted refuse.
- 2) Along the perimeter of the landfill units:

- a) Evidence of leachate seeps, estimated size of affected area, and flow rate (show affected area on map); and
 - b) Evidence of erosion and/or of day-lighted refuse.
- 3) For receiving waters:
- a) Floating and suspended materials of waste origin - presence or absence, source, and size of affected area; and
 - b) Discoloration and turbidity - description of color, source, and size of affected area.

Results of Standard Observations shall be submitted in the semiannual monitoring reports required in Section B.1 of this MRP.

6. Corrective Action Monitoring

The Discharger shall conduct corrective action monitoring to demonstrate the effectiveness of corrective action in accordance with Title 27, section 20430 and this MRP. Groundwater monitoring wells that are in a corrective action monitoring program shall be monitored in accordance with the groundwater monitoring requirements in parts A.1 of this MRP, except as modified in this part of the MRP for any additional constituents or modified monitored frequencies.

The Discharger shall monitor the following corrective action monitoring wells as required in part A.1 and Table I of this MRP, with the following alternate sampling frequency for all Field and Monitoring Parameters listed in Table I:

<u>Well</u>	<u>Zone</u>	<u>Sampling Frequency</u>
MW-1A	A	Semi-Annual
MW-1B	B	Semi-Annual
MW-2A	A	Semi-Annual
MW-2B	B	Semi-Annual
MW-2A1	A	Semi-Annual
MW-3A	A	Semi-Annual
MW-4B	B	Semi-Annual
MW-5A	A	Semi-Annual
MW-6A	A	Semi-Annual
MW-7AR	A	Semi-Annual
MW-7B	B	Semi-Annual
MW-9A	A	Semi-Annual
MW-9B	B	Semi-Annual
MW-11A	A	Semi-Annual
MW-11B	B	Semi-Annual
MW-15A	A	Semi-Annual
MW-16A	A	Semi-Annual
MW-16B	A	Semi-Annual
MW-20A	A	Semi-Annual

<u>Well</u>	<u>Zone</u>	<u>Sampling Frequency</u>
MW-20B	B	Semi-Annual
MW-21A	A	Semi-Annual
MW-21B	B	Semi-Annual
MW-22A	A	Semi-Annual
MW-23A	A	Semi-Annual
MW-24A	A	Semi-Annual
MW-30A	A	Semi-Annual
MW-37A	A	Semi-Annual
MW-37B	B	Semi-Annual
MW-40A	A	Semi-Annual
MW-41A1	A	Semi-Annual
MW-41A2	A	Semi-Annual
MW-41B	B	Semi-Annual

The groundwater extraction well network is as follows:

<u>Extraction Well</u>	<u>Zone</u>	<u>Modules Being Addressed</u>
EW-1	A	M-1
EW-2	A	M-1
EW-3	A	M-1
EW-4	A	M-1
EW-5	A	M-1
EW-6	A	M-1
EW-7	A	M-1
EW-8	A	M-1
EW-9	A	M-1
EW-10	A	M-1
EW-11	A	M-1
EW-11	A	M-1
EW-13	A	M-1
EW-14	A	M-1
EW-15 - future	A	M-1

The Discharger shall record the hours of operation for any corrective action system and report them in the Annual Monitoring Report required in Section B.2 of this MRP. The Discharger shall estimate the following annually to assess the progress of groundwater corrective action and reported in the Annual Monitoring Report (including method of calculations) in the format below:

<u>Zone</u>	Mass of Total VOCs (lbs)	
	<u>Amount Removed During Year</u>	<u>Cumulative Amount Removed</u>
A		
B		
C		

7. Infiltration Basins

Following written Executive Officer approval for the use of infiltration basins for the discharge of extracted groundwater, water samples shall be collected at discharge point into each infiltration basin during operations of the infiltration basins. Samples shall be collected monthly during operations for the constituents listed in Table I and the constituents listed below:

<u>Monitoring Parameter</u>	<u>Unit</u>
Chlorine, Total Residual	mg/L
Dissolved Oxygen	mg/L
Lead	mg/L
Selenium	mg/L
Manganese	mg/L

The Discharger shall collect, preserve, and transport groundwater samples in accordance with an approved *Sample Collection and Analysis Plan*.

B. REPORTING

The Discharger shall submit the following reports in accordance with the required schedule:

Reporting Schedule

<u>Section</u>	<u>Report</u>	<u>End of Reporting Period</u>	<u>Due Date</u>
B.1	Semiannual Monitoring Report	30 June, 31 December	15 August, 15 February
B.2	Annual Monitoring Report	31 December	15 February
B.3	Seep Reporting	Continuous	Immediately & 7 Days
B.4	Annual Facility Inspection Report	31 October	15 November
B.5	Major Storm Event	Continuous	Immediately and 14 days

<u>Section</u>	<u>Report</u>	<u>End of Reporting Period</u>	<u>Due Date</u>
B.6	Reporting Survey and Iso- Settlement Map for Closed Landfills	Every Five Years	from damage discovery At Closure Completion and Every Five Years
B.7	Financial Assurances Report	31 December	15 August

Reporting Requirements

The Discharger shall submit monitoring reports **semiannually** with the data and information as required in this MRP and as required in WDRs Order R5-2016-0013 and the Standard Provisions and Reporting Requirements (particularly Section I: "Standard Monitoring Specifications" and Section J: "Response to a Release"). In reporting the monitoring data required by this program, the Discharger shall arrange the data in tabular form so that the date, the constituents, the concentrations, and the units are readily discernible. The data shall be summarized in such a manner so as to illustrate clearly the compliance with waste discharge requirements or the lack thereof. Data shall also be submitted in a digital format.

Field and laboratory tests shall be reported in each monitoring report. Semiannual and annual monitoring reports shall be submitted to the Central Valley Water Board in accordance with the above schedule for the calendar period in which samples were taken or observations made. In addition, the Discharger shall enter all monitoring data and monitoring reports into the online Geotracker database as required by Division 3 of Title 27 and Chapter 30, Division 3 of Title 23.

The results of **all monitoring** conducted at the site shall be reported to the Central Valley Water Board in accordance with the reporting schedule above for the calendar period in which samples were taken or observations made.

The Discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained throughout the life of the facility including the post-closure period. Such records shall be legible and shall show the following for each sample:

- a) Sample identification and the monitoring point or background monitoring point from which it was taken, along with the identity of the individual who obtained the sample;
- b) Date, time, and manner of sampling;
- c) Date and time that analyses were started and completed, and the name of the personnel and laboratory performing each analysis;

- d) Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;
- e) Calculation of results; and
- f) Results of analyses, and the MDL and PQL for each analysis. All peaks shall be reported.

Required Reports

1. **Semiannual Monitoring Report:** Monitoring reports shall be submitted semiannually and are due on **15 August** and **15 February**. Each semiannual monitoring report shall contain at least the following:
 - a) For each groundwater monitoring point addressed by the report, a description of:
 - 1) The time of water level measurement;
 - 2) The type of pump - or other device - used for purging and the elevation of the pump intake relative to the elevation of the screened interval;
 - 3) The method of purging used to stabilize water in the well bore before the sample is taken including the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; results of pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water;
 - 4) The type of pump - or other device - used for sampling, if different than the pump or device used for purging; and
 - 5) A statement that the sampling procedure was conducted in accordance with the approved *Sample Collection and Analysis Plan*.
 - b) A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.
 - c) The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report [Title 27, section 20415(e)(15)].
 - d) Tabulated monitoring data for all monitoring points and constituents for groundwater, unsaturated zone, leachate, and surface water. Concentrations below the laboratory reporting limit shall not be reported as "ND" unless the reporting limit is also given in the table. Otherwise they shall be reported "<" the reporting limit (e.g., <0.10). Units shall be as required in Tables I through IV unless specific justification is given to report in other units. Refer to the SPRRs Section I "Standard Monitoring Specifications" for requirements regarding MDLs and PQLs.

- e) Laboratory statements of results of all analyses evaluating compliance with requirements.
 - f) An evaluation of the concentration of each monitoring parameter (or 5-year COC when five year COC sampling is conducted) as compared to the current concentration limits, and the results of any required verification testing for constituents exceeding a concentration limit. Report any actions taken under Section J: Response to a Release for verified exceedances of a concentration limit for wells/constituents not already in corrective action monitoring.
 - g) An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the run-off/run-on control facilities. Include a summary of any instances where leachate depth on an MSW landfill liner system exceeded 30 cm (excluding the leachate sump), and information about the required notification and corrective action in Standard Facility Specification E.13 of the SPRRs.
 - h) A summary of all Standard Observations for the reporting period required in Section A.0 of this MRP.
 - i) A summary of inspection, leak search, and repair of final covers on any closed landfill units in accordance with an approved final post-closure maintenance plan as required by Standard Closure and Post-Closure Maintenance Specifications G.26 through G.29 of the SPRRs.
2. **Annual Monitoring Report:** The Discharger shall submit an Annual Monitoring Report to the Central Valley Water Board by **15 February** covering the reporting period of the previous monitoring year. If desired, the Annual Monitoring Report may be combined with the second semiannual report, but if so, shall clearly state that it is both a semi-annual and annual monitoring report in its title. Each Annual Monitoring Report shall contain the following information:
- a) All monitoring parameters shall be graphed to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years. If a 5-year COC event was performed, than these parameters shall also be graphically presented. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. Graphical analysis of monitoring data may be used to provide significant evidence of a release.
 - b) An evaluation of the monitoring parameters with regards to the cation/anion balance, and a graphical presentation using a Stiff diagram, a Piper graph, or a Schoeller plot.
 - c) All historical monitoring data for which there are detectable results, including data for the previous year, shall be submitted in tabular form in a digital file

format. The Central Valley Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27, section 20420(h)], that facilitates periodic review by the Central Valley Water Board.

- d) Hydrographs of each well showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.
 - e) A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.
 - f) A map showing the area and elevations in which filling has been completed during the previous calendar year and a comparison to final closure design contours, and include a projection of the year in which each discrete landfill module will be filled.
 - g) A written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.
 - h) The results of the annual testing of leachate collection and removal systems required under Standard Facility Specification E.14 of the SPRRs.
 - i) Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.
 - j) A comprehensive discussion of any Corrective Action Program required by this MRP under Section A.6.
3. **Seep Reporting:** The Discharger shall report by telephone any seepage from the disposal area **immediately** after it is discovered. A written report shall be filed with the Central Valley Water Board **within seven days**, containing at least the following information:
- a) A map showing the location(s) of seepage;
 - b) An estimate of the flow rate;
 - c) A description of the nature of the discharge (e.g., all pertinent observations and analyses);
 - d) Verification that samples have been submitted for analyses of the Field Parameters and Monitoring Parameters listed in Table IV of this MRP, and an estimated date that the results will be submitted to the Central Valley Water Board; and
 - e) Corrective measures underway or proposed, and corresponding time schedule.

4. **Annual Facility Inspection Reporting:** By **15 November** of each year, the Discharger shall submit a report describing the results of the inspection and the repair measures implemented, preparations for winter, and include photographs of any problem areas and the repairs. Refer to Section A.5.a of this MRP, above.
5. **Major Storm Event Reporting:** Following major storm events capable of causing damage or significant erosion, the Discharger **immediately** shall notify Central Valley Water Board staff of any damage or significant erosion upon discovery and report subsequent repairs within **14 days** of completion of the repairs, including photographs of the problem and the repairs. Refer to Section A.5.b of this MRP, above.
6. **Survey and Iso-Settlement Map for Closed Landfills:** The Discharger shall conduct a survey and submit an iso-settlement map for each closed area of the landfill every five years pursuant to Title 27, section 21090(e). Refer to Section A.5.c of this MRP, above. The next report is due immediately following closure of each unit.
7. **Financial Assurances Report:** By **15 August** of each year, the Discharger shall submit a copy of the annual financial assurances report due to CalRecycle that updates the financial assurances for closure, post-closure maintenance, and corrective action. Refer to Financial Assurances Specifications F.1 through F.3 of the WDRs.

C. WATER QUALITY PROTECTION STANDARD AND COMPLIANCE PERIOD

1. Water Quality Protection Standard Report

For each waste management unit, the Water Quality Protection Standard shall consist of all COCs, the concentration limit for each constituent of concern, the verification retesting procedure to confirm measurably significant evidence of a release, the point of compliance, and all water quality monitoring points for each monitored medium.

The Water Quality Protection Standard for naturally occurring waste constituents consists of the COCs, the concentration limits, and the point of compliance and all monitoring points. Any proposed changes to the Water Quality Protection Standard other than annual update of the concentration limits shall be submitted in a report for review and approval.

The report shall:

- a. Identify **all distinct bodies of surface and ground water** that could be affected in the event of a release from a waste management unit or portion of a unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.
- b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with Title 27, section 20405.
- c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).
- d. Include a proposed statistical method for calculating concentration limits for monitoring parameters and constituents of concern that are detected in 10% or greater of the background data (naturally-occurring constituents) using a statistical procedure from Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).
- e. Include a retesting procedure to confirm or deny measurably significant evidence of a release pursuant to Title 27, section 20415(e)(8)(E) and section 20420(j)(1-3).

The Water Quality Protection Standard shall be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27. If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Discharger may request modification of the Water Quality Protection Standard.

The Discharger submitted a 17 September 2015 *Detection Monitoring Program* including a Water Quality Protection Standard (WQPS) proposing statistical data analysis methods to calculate concentration limits for each monitored constituent in accordance with Title 27. Concentration limits are calculated using Interwell tolerance limits at 95% confidence and 95% coverage based on background data from background monitoring wells. The Water Quality Protection Standard shall be updated annually for each monitoring well using new and historical monitoring data.

2. **Monitoring Parameters**

Monitoring parameters are a select group of constituents that are monitored during each monitoring event that are the waste constituents, reaction products,

hazardous constituents, and physical parameters that provide a reliable indication of a release from a waste management unit. The monitoring parameters for all waste management units are those listed in Tables I through VI for the specified monitored medium.

3. Constituents of Concern (COCs)

The COCs include a larger group of waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit, and are required to be monitored every five years [Title 27, sections 20395 and 20420(g)]. The COCs for all waste management units at the facility are those listed in Tables I through V for the specified monitored medium, and Table VII. The Discharger shall monitor all COCs every five years, or more frequently as required in accordance with a Corrective Action Program. The last 5-year COC report for 2015 is scheduled for submittal by 31 January 2016 in the *Annual Monitoring Report*, and 5-year COCs are due to be monitored again in **2020**.

4. Concentration Limits

For a naturally occurring constituent of concern with the exception of turbidity, the concentration limit for each constituent of concern shall be determined as follows:

- a. By calculation in accordance with a statistical method pursuant to Title 27, section 20415(e)(8); or
- b. By an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).

Concentration limits shall not be calculated for turbidity because turbidity is typically used to evaluate the well conditions and may not be indicative of a release to groundwater.

Concentration limits are calculated using Interwell tolerance limits for each groundwater zone at 95% confidence and 95% coverage based on background data from background monitoring wells as specified below. Tolerance limits will be calculated when a minimum of 8 data points are collected from new background wells.

- a. A-zone concentration limits shall be calculated using background wells MW-10A, MW-38A and MW-39A and future background wells MW-34A and MW-35A.

- b. B-zone concentration limits shall be calculated using background wells MW-10B, MW-38B, and MW-39B, and future background wells MW-34A and MW-35A.
- c. C-zone concentration limits shall be calculated using background well MW-10C and future C-zone background wells.

The most recent concentration limits for select parameters as reported in the 30 January 2015 *Annual Monitoring Report* were as follows:

Background Well		MW-10A ¹	MW-10B	MW-10C
Analysis Type		Interwell	Interwell	Interwell
Groundwater zone		A	B	C
pH	Std units	4.9-7.6	6.0-7.7	6.6-7.5
EC	umhos/cm	252	213	246
Chloride	mg/L ²	18.8	11.0	10.2
Nitrate as N	mg/L	1.8	1.8	1
Sulfate	mg/L	9.0	10	15.7
TDS	mg/L	217	220	227
Bicarbonate ²	mg/L	92	100	114
Carbonate ²	mg/L	DL ⁸	DL	DL
Aluminum	µg/L	3,900	30	40
Antimony	µg/L	250	2	5.7
Arsenic	µg/L	260	4	8.7
Barium	µg/L	44	41	47
Beryllium	µg/L	DL	DL	DL
Cadmium	µg/L	5	1	1
Chromium	µg/L	10	4.1	3
Chromium VI	µg/L	10	4.1	3
Cobalt	µg/L	0.7	1.6	1
Copper	µg/L	2,050	50	4.4
Cyanide	µg/L	DL	DL	DL
Iron	µg/L	270	47	110
Lead	µg/L	93	20	4.2
Manganese	µg/L	90	2.5	3.5
Mercury	µg/L	DL	DL	DL
Nickel	µg/L	25	1	1.8
Selenium	µg/L	2.5	4	4
Silver	µg/L	5	1	42
Thallium	µg/L	5	DL	DL
Tin	µg/L	DL	DL	DL
Vanadium	µg/L	23	18	35

Background Well		MW-10A ¹	MW-10B	MW-10C
Analysis Type		Interwell	Interwell	Interwell
Groundwater zone		A	B	C
Zinc	µg/L	2,990	33	35
Sulfide	µg/L	DL	DL	DL

EC – Electrical Conductivity
 TDS –Total Dissolved Solids
 mg/L – Milligrams per liter
 µg/L – micrograms per liter
 DL – detection limit

NA – not applicable
 1. Concentration limits last calculated in 2003 before MW-10A dried out.
 2. As CaCo₃

5. Retesting Procedures for Confirming Evidence of a Release

If monitoring results indicate measurably significant evidence of a release, as described in Standard Monitoring Specification I.45 of the SPRRs, then:

- a. For analytes that are detected in less than 10% of the background samples (such as non-naturally occurring constituents), the Discharger shall use the non-statistical retesting procedure required in Standard Monitoring Specification I.46 of the SPRRs.
- b. For analytes that are detected in 10% or greater of the background samples (naturally occurring constituents), the Discharger shall use one of the statistical retesting procedure as required in Standard Monitoring Specification I.47 of the SPRRs.

6. Point of Compliance

The point of compliance for the water standard at each waste management unit is a vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the unit. The following are monitoring locations at the point of compliance:

<u>Cell or Module</u>	<u>Point of Compliance Monitoring Wells</u>
M-1	MW-1A, MW-1B, MW-2A, MW-2A1, MW-2B, MW-7AR, MW-7B, MW-6A, MW-6A1
M-1L	MW-11A, MW-11B
M-2	MW-15A, MW-15B, MW-37A, MW-37B
M-3	MW-15A, MW-15B, MW-37A, MW-37B
M-4	MW-36A
M-5	MW-36A
M-6	MW-15A, MW-15B, MW-37A, MW-37B
M-7	MW-11A, MW-11B, MW-15A, MW-15B, MW-37A, MW-37B
M-8	MW-7AR, MW-7B, MW-11A, MW-11B

TABLE I
GROUNDWATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters³			
Groundwater Elevation	Ft. & 100ths, M.S.L.	Quarterly	Semiannual
Temperature	°C	Semiannual	Semiannual
Electrical Conductivity	umhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Turbidity	Turbidity units	Semiannual	Semiannual
Monitoring Parameters³			
Total Dissolved Solids (TDS)	mg/L ¹	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L ²	Semiannual	Semiannual
5-Year Constituents of Concern^{4,5} (see Table VII)		5 years	2020 and every 5 years thereafter

¹ Milligrams per liter

² Micrograms per liter

³ Field and monitoring parameters for C zone wells shall be collected annually, with the exception of groundwater elevation that shall be recorded quarterly.

⁴ 5-year COC monitoring shall include all background wells and point of compliance wells for all constructed landfill modules.

⁵ The two corrective action wells with the highest total VOC concentrations shall be analyzed for 5-year COCs annually.

TABLE II

UNSATURATED ZONE DETECTION MONITORING PROGRAM

PAN LYSIMETERS¹ (or other vadose zone monitoring device)

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters			
Electrical Conductivity	umhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Volume of liquid removed	gallons	Monthly	Semiannual
Monitoring Parameters			
Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L	Semiannual	Semiannual
5-Year Constituents of Concern (see Table VII)		5 years	2020 and every 5 years thereafter

¹ Pan lysimeters shall be inspected for the presence of liquid **monthly**. If liquid is detected in a previously dry pan lysimeter, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the liquid for Field and Monitoring Parameters listed above.

TABLE III

UNSATURATED ZONE DETECTION MONITORING PROGRAM

SOIL-PORE GAS

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Monitoring Parameters			
Volatile Organic Compounds ¹ (USEPA Method TO-15)	ug/cm ³	Annual	Annual
Methane ¹	%	Semiannual	Semiannual
Carbon Dioxide ¹	%	Semiannual	Semiannual
Oxygen ¹	%	Semiannual	Semiannual

¹ The Discharger may prescreen the gas sample to determine if the sample is required to be laboratory analyzed using Method TO-15 by using an approved gas analyzer to establish methane concentrations at the sampling point. If while using an approved sampling and analysis plan procedure the Discharger detects methane concentrations exceeding 1.0 percent by volume, then a gas sample shall be obtained and laboratory analyzed for specific VOCs using EPA Method TO-15. Both the screening results and laboratory analysis results shall be reported. Otherwise, the Discharger shall report the methane screening results and no further laboratory analysis is required.

TABLE IV
LEACHATE MONITORING ¹, SEEP MONITORING ², AND LCRS TESTING ³

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Field Parameters			
Total Flow	Gallons	Monthly	Semiannual
Flow Rate	Gallons/Day	Monthly	Semiannual
Electrical Conductivity	umhos/cm	Quarterly	Semiannual
pH	pH units	Quarterly	Semiannual
Monitoring Parameters			
Total Dissolved Solids (TDS)	mg/L	Annual	Annual
Chloride	mg/L	Annual	Annual
Bicarbonate	mg/L	Annual	Annual
Nitrate - Nitrogen	mg/L	Annual	Annual
Sulfate	mg/L	Annual	Annual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L	Annual	Annual
5-Year Constituents of Concern (see Table VII)		5 years	2020 and every 5 years thereafter
LCRS Testing ³	---	Annually	Annually

¹ If leachate is detected in a previously dry sump, the Discharger shall verbally notify Central Valley Water Board staff within **seven days** and shall immediately sample and test the leachate for Field and Monitoring Parameters listed in Table IV. Leachate in the LCRS sump shall then be sampled for all parameters and constituents in accordance with the frequencies listed in Table IV whenever liquid is present.

² Leachate seeps shall be sampled and analyzed for the Field and Monitoring Parameters in this table upon detection. The quantity of leachate shall be estimated and reported in gallons/day. Also, refer to Section B.3

³ The Discharger shall test each LCRS annually pursuant to Title 27, section 20340(d) to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions.

TABLE V
SURFACE WATER DETECTION MONITORING PROGRAM

<u>Parameter</u>	<u>Units</u>	<u>Sampling Frequency</u> ¹	<u>Reporting Frequency</u>
Field Parameters			
Electrical Conductivity	umhos/cm	Semiannual	Semiannual
pH	pH units	Semiannual	Semiannual
Turbidity	Turbidity units	Semiannual	Semiannual
Flow to Waters of U.S.	Yes/No	Semiannual	Semiannual
Monitoring Parameters			
Total Dissolved Solids (TDS)	mg/L	Semiannual	Semiannual
Bicarbonate	mg/L	Semiannual	Semiannual
Chloride	mg/L	Semiannual	Semiannual
Nitrate - Nitrogen	mg/L	Semiannual	Semiannual
Sulfate	mg/L	Semiannual	Semiannual
Volatile Organic Compounds (USEPA Method 8260B, short list, see Table VI)	ug/L	Semiannual	Semiannual
Chemical Oxygen Demand	mg/L	Annually	Annually
5-Year Constituents of Concern (see Table VII)		5 years	2020 and every 5 years thereafter

¹ Semiannual surface water monitoring is required twice per year when there is water present at the designated surface water monitoring point any time during the year. Reporting shall include whether there was flow from the facility to waters of the U.S. when the samples were collected.

TABLE VI – page 1 of 2

MONITORING PARAMETERS FOR DETECTION MONITORING

Surrogates for Metallic Constituents:

<u>Compound</u>	<u>Geotracker Code</u>
pH	PH
Total Dissolved Solids	TDS
Electrical Conductivity	COND
Chloride	CL
Sulfate	SO4
Nitrate nitrogen	NO3N

Volatile Organic Compounds, short list:

USEPA Method 8260B¹

Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane (Ethyl chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene dibromide; EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
m-Dichlorobenzene (1,3-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans- 1,4-Dichloro-2-butene
Dichlorodifluoromethane (CFC-12)
1,1-Dichloroethane (Ethylidene chloride)
1,2-Dichloroethane (Ethylene dichloride)
1,1 -Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene dichloride)
cis- 1,3-Dichloropropene
trans- 1,3-Dichloropropene
Di-isopropylether (DIPE)
Ethanol
Ethyltertiary butyl ether
Ethylbenzene
2-Hexanone (Methyl butyl ketone)
Hexachlorobutadiene
Methyl bromide (Bromomethene)
Methyl chloride (Chloromethane)

TABLE VI – page 2 of 2

MONITORING PARAMETERS FOR DETECTION MONITORING

Methylene bromide (Dibromomethane)
Methylene chloride (Dichloromethane)
Methyl ethyl ketone (MEK: 2-Butanone)
Methyl iodide (Iodomethane)
Methyl t-butyl ether
4-Methyl-2-pentanone (Methyl isobutylketone)
Naphthalene
Styrene
Tertiary amyl methyl ether
Tertiary butyl alcohol
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene)
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene)
Trichlorofluoromethane (CFC- 11)
1,2,3-Trichloropropane
Vinyl acetate
Vinyl chloride
Xylenes

¹For groundwater monitoring locations with no individual VOC concentrations above 1 ppb, the compounds ethanol, methyl iodide (iodomethane) and vinyl acetate are removed from the constituent list, and a search for unknown chromatographic peaks (SPRR Section I.17) is waived.

TABLE VII – page 1 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

<u>Compound</u>	<u>USEPA Method</u>	<u>Geotracker Code</u>
Total Organic Carbon	9060A	TOC
Calcium	6010B	CA
Magnesium	6010B	MG
Potassium	6010B	K
Sodium	6010B	NA

<u>Inorganics (dissolved):</u>	<u>USEPA Method</u>	<u>Geotracker Code</u>
Aluminum	6010	AL
Antimony	7041	SB
Barium	6010	BA
Beryllium	6010	BE
Cadmium	7131A	CD
Chromium	6010	CR
Cobalt	6010	CO
Copper	6010	CU
Silver	6010	AG
Tin	6010	SN
Vanadium	6010	V
Zinc	6010	ZN
Iron	6010	FE
Manganese	6010	MN
Arsenic	7062	AS
Lead	7421	PB
Mercury	7470A	HG
Nickel	7521	NI
Selenium	7742	SE
Thallium	7841	TL
Cyanide	9010C	CN
Sulfide	9030B	S

Volatile Organic Compounds, extended list (USEPA Method 8260B):

<u>COC Description</u>	<u>Geotracker Code</u>
Acetone	ACE
Acetonitrile	ACCN
Acrolein	ACRL
Acrylonitrile	ACRAMD
Allyl chloride	CLPE3
Benzene	BZ
Bromochloromethane	BRCLME
Dibromochloromethane	DBCME
Bromoform	TBME
Carbon disulfide	CDS
Carbon tetrachloride	CTCL
Chlorobenzene	CLBZ
Chloroethane	CLEA
Chloroform	TCLME

TABLE VII – page 2 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

Volatile Organic Compounds, extended list (continued):

<u>COC Description</u>	<u>Geotracker Code</u>
2-Chloro-1,3-butadiene (Chloroprene)	CHLOROPRENE
Dibromochloromethane	DBCME
1,2-Dibromo-3-chloropropane	DBCP
1,2-Dibromoethane	EDB
1,2-Dichlorobenzene	DCBZ12
1,3-Dichlorobenzene	DCBZ13
1,4-Dichlorobenzene	DCBZ14
trans-1,4-Dichloro-2-butene	DCBE14T
Dichlorodifluoromethane	FC12
1,1-Dichloroethane	DCA11
1,2-Dichloroethane	DCA12
1,1-Dichloroethene	DCE11
cis-1,2-Dichloroethene	DCE12C
trans-1,2-Dichloroethene	DCE12T
1,2-Dichloropropane	DCPA12
1,3-Dichloropropane	DCPA13
2,2-Dichloropropane	DCPA22
1,1-Dichloropropene	DCP11
cis-1,3-Dichloropropene	DCP13C
trans-1,3-Dichloropropene	DCP13T
Di-isopropyl ether (DIPE)	DIPE
Ethanol (EtOH)	ETHANOL
Ethyl tert-butyl ether (ETBE)	ETBE
Ethylbenzene	EBZ
Ethyl methacrylate	EMETHACRY
Hexachlorobutadiene	HCBU
2-Hexanone	HXO2
Isobutanol	ISOBTOH
Methacrylonitrile	METHACRN
Bromomethane	BRME
Chloromethane	CLME
2-Butanone	MEK
Methyl iodide	IME
Methyl-tert-butyl ether (MTBE)	MTBE
Methylmethacrylate	MMETHACRY
4-Methyl-2-pentanone	MIBK
Dibromomethane	DBMA
Dichloromethane	DCMA
Naphthalene	NAPH
Propionitrile	PACN
Styrene	STY
tert-Amyl methyl ether (TAME)	TAME
tert-Butyl alcohol (TBA)	TBA
1,1,1,2-Tetrachloroethane	TC1112

TABLE VII – page 3 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

Volatile Organic Compounds, extended list (continued)

<u>COC Description</u>	<u>Geotracker Code</u>
1,1,2,2-Tetrachloroethane	PCA
Tetrachloroethene (PCE)	PCE
Toluene	BZME
1,2,4-Trichlorobenzene	TCB124
1,1,1-Trichloroethane	TCA111
1,1,2-Trichloroethane	TCA112
Trichloroethene (TCE)	TCE
Trichlorofluoromethane	FC11
1,2,3-Trichloropropane	TCPR123
Vinyl acetate	VA
Vinyl chloride	VC
Xylenes	XYLENES

Semi-Volatile Organic Compounds (USEPA Method 8270C or D - base, neutral, & acid extractables):

<u>COC Description</u>	<u>Geotracker Code</u>
Acenaphthene	ACNP
Acenaphthylene	ACNPY
Acetophenone	ACPHN
2-Acetylaminofluorene	ACAMFL2
Aldrin	ALDRIN
4-Aminobiphenyl	AMINOBP4
Anthracene	ANTH
Benzo(a)anthracene	BZAA
Benzo(b)fluoranthene	BZBF
Benzo(k)fluoranthene	BZKF
Benzo(g,h,i)perylene	BZGHIP
Benzo(a)pyrene	BZAP
Benzyl alcohol	BZLAL
Bis-(2-ethylhexyl)phthalate	BIS2EHP
alpha-BHC	BHCALPHA
beta-BHC	BHCBETA
delta-BHC	BHCDELTA
gamma-BHC (Lindane)	BHCGAMMA
Bis-(2-chloroethoxy)methane	BECEM
Bis-(2-chloroethyl)ether	BIS2CEE
Bis(2-chloroisopropyl)ether	BIS2CIE
4-Bromophenyl phenyl ether	BPPE4
Benzyl butyl phthalate	BBP
Chlordane	CHLORDANE
4-Chloroaniline	CLANIL4

TABLE VII – page 4 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

<u>COC Description</u>	<u>Geotracker Code</u>
Chlorobenzilate	CLBZLATE
4-Chloro-3-methylphenol	C4M3PH
2-Chloronaphthalene	CNPH2
2-Chlorophenol	CLPH2
4-Chlorophenyl phenyl ether	CPPE4
Chrysene	CHRYSENE
2-Methylphenol (o-Cresol)	MEPH2
3-methylphenol	MEPH3
4-Methylphenol (p-Cresol)	MEPH4
4,4'-DDD	DDD44
4,4'-DDE	DDE44
4,4'-DDT	DDT44
Diallate (cis- or trans-)	DIALLATE
Dibenzo(a,h)anthracene	DBAHA
Dibenzofuran	DBF
Di-n-butyl phthalate	DNBP
3,3'-Dichlorobenzidine	DBZD33
2,4-Dichlorophenol	DCP24
2,6-Dichlorophenol	DCP26
Dieldrin	DIELDRIN
Diethyl phthalate	DEPH
azobenzene	AZOBENZENE
7,12-Dimethylbenz(a)anthracene	DMBZA712
3,3'-Dimethylbenzidine	DMBZD33
2,4-Dimethylphenol	DMP24
Dimethyl phthalate	DMPH
1,3-Dinitrobenzene	DNB13
2-Methyl-4,6-dinitrophenol	DN46M
2,4-Dinitrophenol	DNP24
2,4-Dinitrotoluene	DNT24
2,6-Dinitrotoluene	DNT26
Di-n-octyl phthalate	DNOP
Diphenylamine	DPA
Endosulfan I	ENDOSULFANA
Endosulfan II	ENDOSULFANB
Endosulfan sulfate	ENDOSULFANS
Endrin	ENDRIN
Endrin aldehyde	ENDRINALD
Ethyl methanesulfonate	EMSULFN
Famphur	FAMPHUR
Fluoranthene	FLA
Fluorene	FL

TABLE VII – page 5 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

Semi-Volatile Organic Compounds (continued)

<u>COC Description</u>	<u>Geotracker Code</u>
Heptachlor	HEPTACHLOR
Heptachlor epoxide	HEPT-EPOX
Hexachlorobenzene	HCLBZ
Hexachlorocyclopentadiene	HCCP
Hexachloroethane	HCLEA
Hexachloropropene	HCPR
Indeno(1,2,3-cd)pyrene	INP123
Isodrin	ISODRIN
Isophorone	ISOP
Isosafrole	ISOSAFR
Kepone	KEP
Methapyrilene	MTPYRLN
Methoxychlor	MTXYCL
3-Methylcholanthrene	MECHLAN3
Methyl methanesulfonate	MMSULFN
2-Methylnaphthalene	MTNPH2
1,4-Naphthoquinone	NAPHQ14
1-Naphthylamine	AMINONAPH1
2-Naphthylamine	AMINONAPH2
2-Nitroaniline	NO2ANIL2
3-Nitroaniline	NO2ANIL3
4-Nitroaniline	NO2ANIL4
Nitrobenzene	NO2BZ
2-Nitrophenol	NTPH2
4-Nitrophenol	NTPH4
n-Nitroso-di-n-butylamine	NNSBU
N-Nitrosodiethylamine	NNSE
N-Nitrosodimethylamine	NNSM
N-Nitrosodiphenylamine	NNSPH
n-Nitrosodi-n-propylamine	NNSPR
N-Nitrosomethylethylamine	NNSME
N-Nitrosopiperidine	NNSPPRD
N-Nitrosopyrrolidine	NNSPYRL
5-Nitro-o-toluidine	TLDNONT5
Pentachlorobenzene	PECLBZ
Pentachloronitrobenzene	PECLNO2BZ
Pentachlorophenol	PCP
Phenacetin	PHNACTN
Phenanthrene	PHAN
Phenol	PHENOL
1,4-Phenylenediamine	ANLNAM4
Polychlorinated biphenyls (PCBs)	PCBS

TABLE VII – page 6 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

Semi-Volatile Organic Compounds (continued)

<u>COC Description</u>	<u>Geotracker Code</u>
Pronamide	PRONAMD
Pyrene	PYR
Safrole	SAFROLE
1,2,4,5-Tetrachlorobenzene	C4BZ1245
2,3,4,6-Tetrachlorophenol	TCP2346
o-Toluidine	TLDNO
Toxaphene	TOXAP
2,4,5-Trichlorophenol	TCP245
o,o,o-Triethyl phosphorothioate	TEPTH
1,3,5-Trinitrobenzene	TNB135

Chlorophenoxy Herbicides (USEPA Method 8151A):

<u>COC Description</u>	<u>Geotracker Code</u>
2,4-D	24D
Dinoseb	DINOSEB
2,4,5-TP (Silvex)	SILVEX
2,4,5-T	245T

Organophosphorus Compounds (USEPA Method 8141B):

<u>COC Description</u>	<u>Geotracker Code</u>
Atrazine	ATRAZINE
Chlorpyrifos	CLPYRIFOS
Thionazine	ZINOPHOS
Diazinon	DIAZ
Dimethoate	DIMETHAT
Disulfoton	DISUL
Parathion methyl	PARAM
Parathion ethyl	PARAE
Phorate	PHORATE
Simazine	SIMAZINE

TABLE VII – page 7 of 7

5-YEAR COCs & APPROVED USEPA ANALYTICAL METHODS

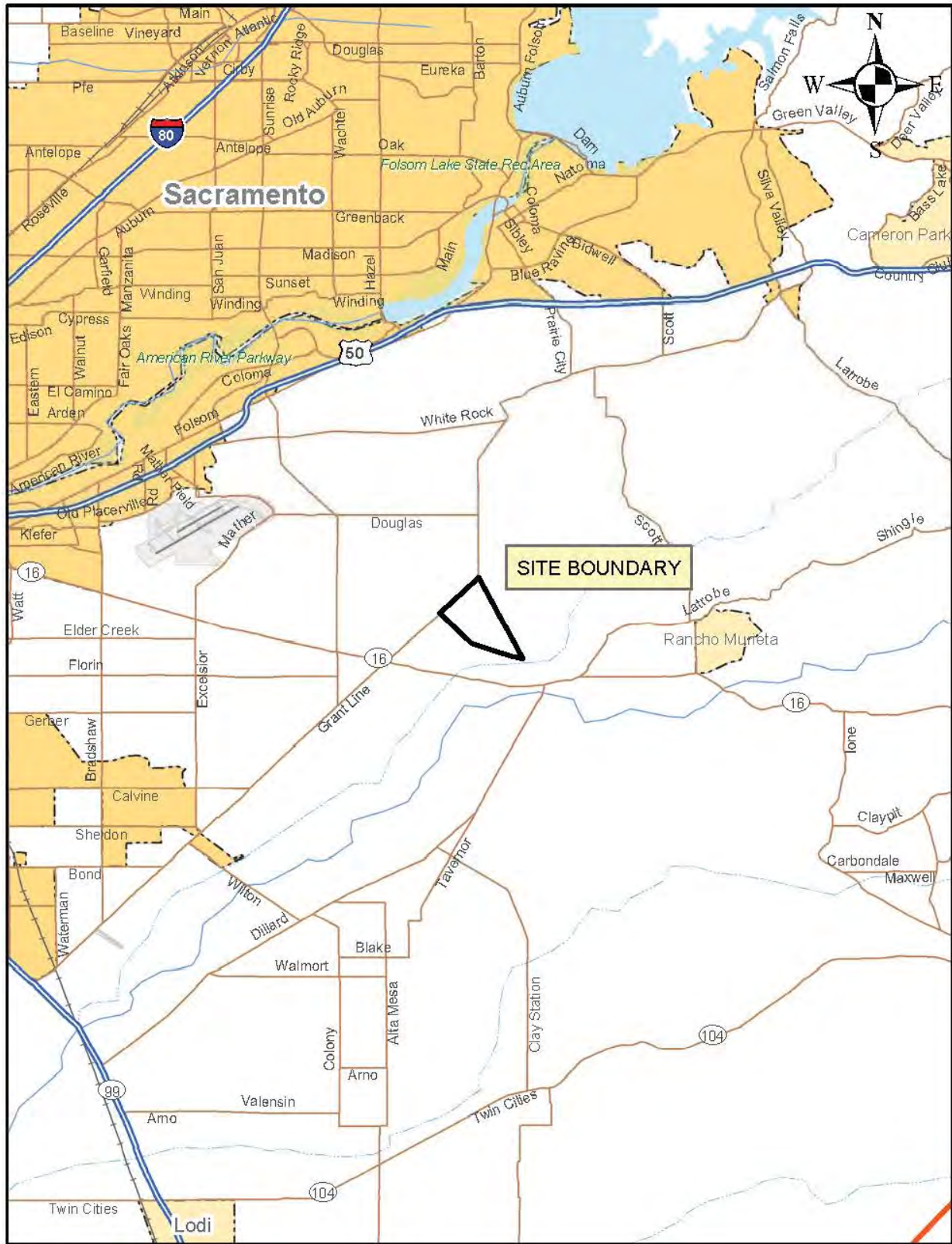
Organochlorine Pesticides And Polychlorinated Biphenyls

USEPA METHOD 8080

alpha-BHC
2 beta-BHC
2 delta-BHC
2 gamma-BHC (Lindane)
Heptachlor
Aldrin
Heptachlor epoxide
Endosulfan I
Dieldrin
4,4'-DDE
Endrin
Endosulfan II
4,4'-DDD
Endosulfan sulfate
4,4'-DDT
Methoxychlor
Endrin ketone
Endrin aldehyde
alpha-Chlordane
2 gamma-Chlordane
Toxaphene
Aroclor-1016
Aroclor-1221
Aroclor-1232
Aroclor-1242
Aroclor-1248
Aroclor-1254
Aroclor-1260

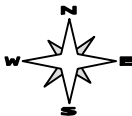
Geotracker Code

BHCALPHA
BHCBETA
BHCBETA
BHC GAMMA
HEPT-EPOX
ALDRIN
HEPT-EPOX
ALDRIN
DIELDRIN
DDE44
ENDRIN
ENDOSULFANB
DDD44
ENDOSULFANS
DDT44
MTXYCL
ENDRINKET
ENDRINALD
CHLORDANEA
CHLORDANEG
TOXAP
PCB1016
PCB1221
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PCB1242
PCB1248
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PCB1260

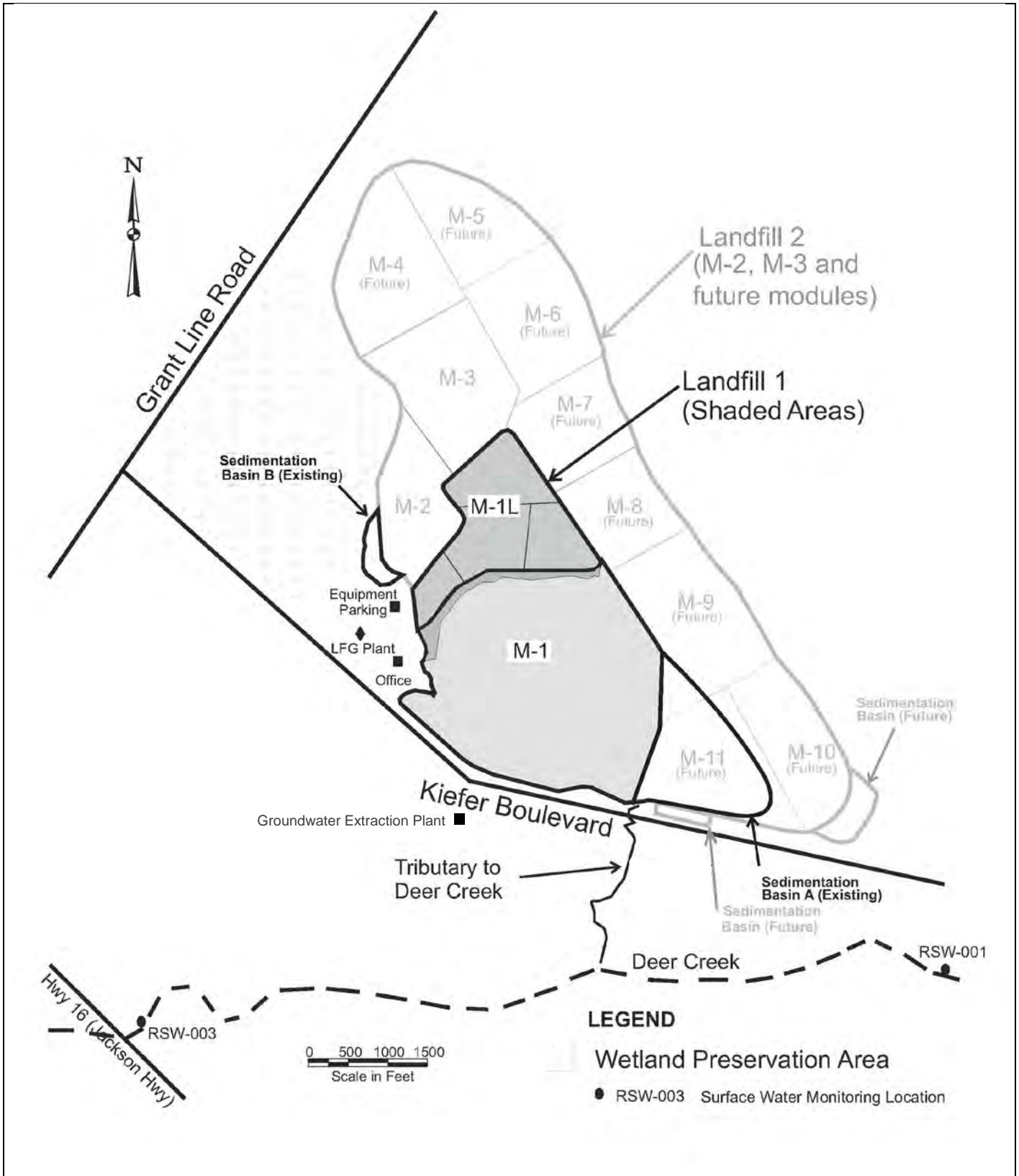


Drawing Reference:
 2015 JTD, Figure 2
 Sacramento County

SITE LOCATION MAP
 Sacramento County Waste Management/Recycling
 Kiefer Landfill
 Sacramento County

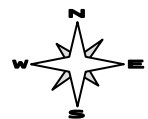


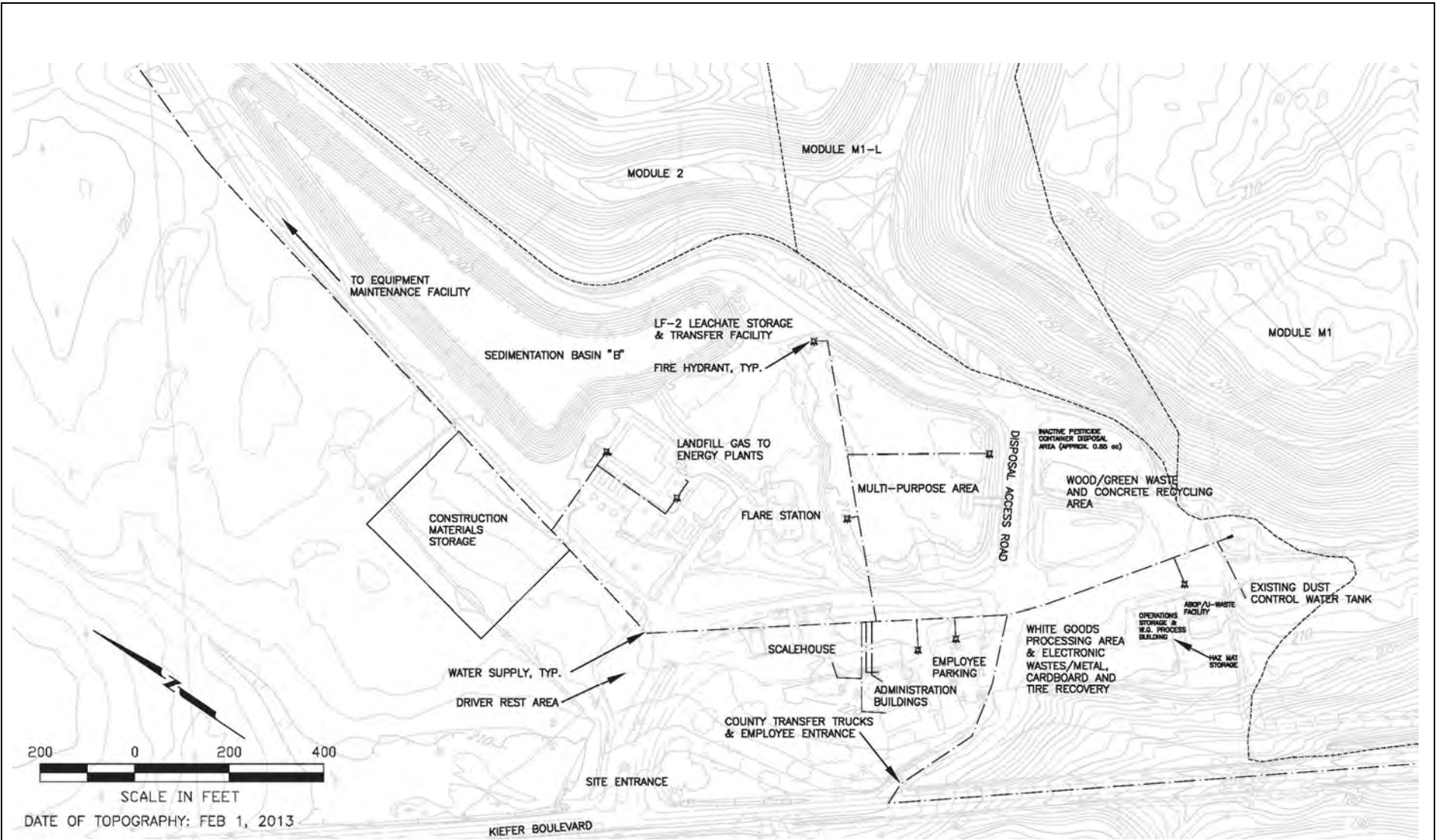
Scale:
 Approx 1:250,000



SITE PLAN

Sacramento County Waste Management/Recycling
Kiefer Landfill
Sacramento County

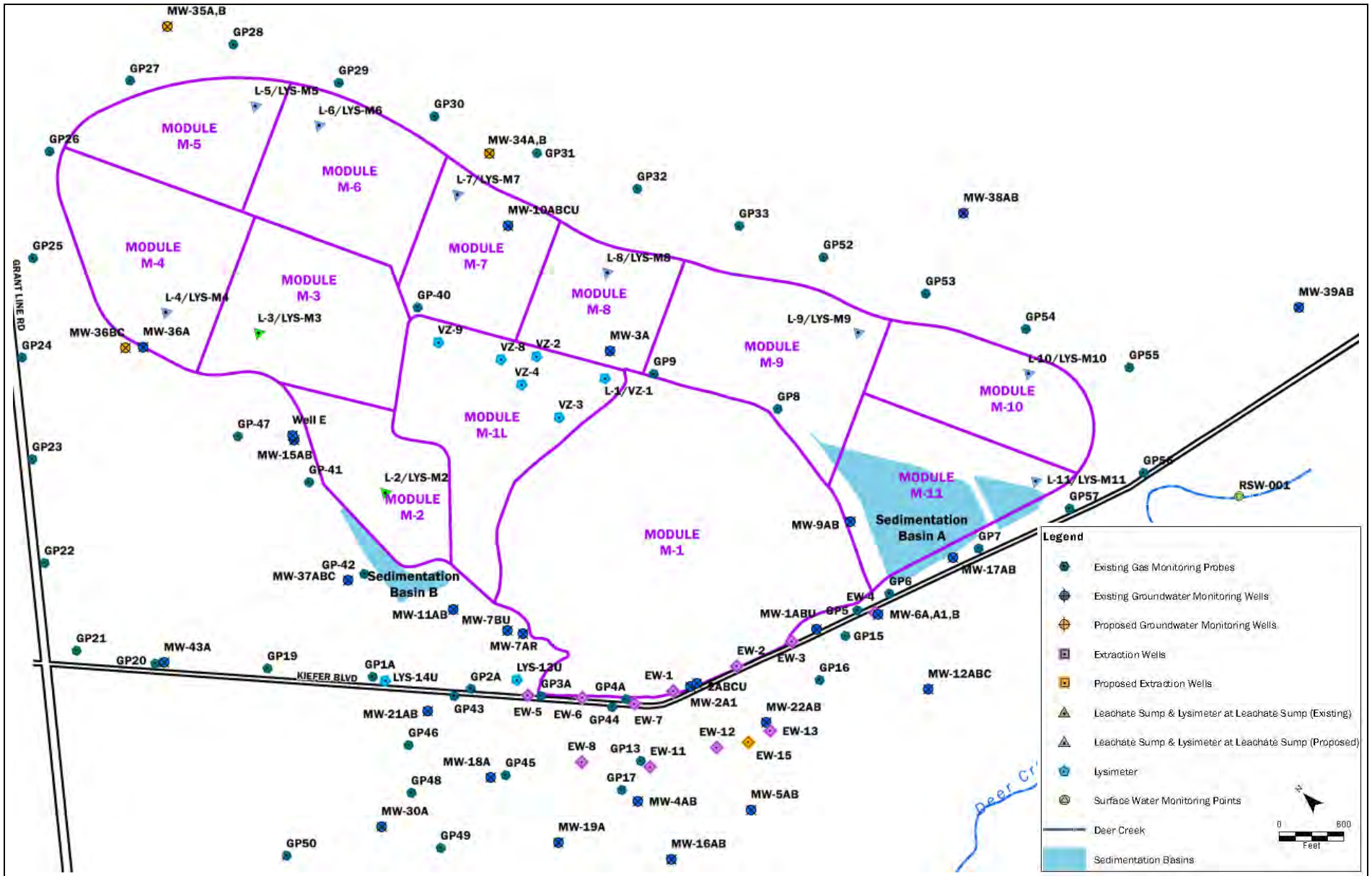




Drawing Reference:
 2015 JTD, Figure 5
 Sacramento County

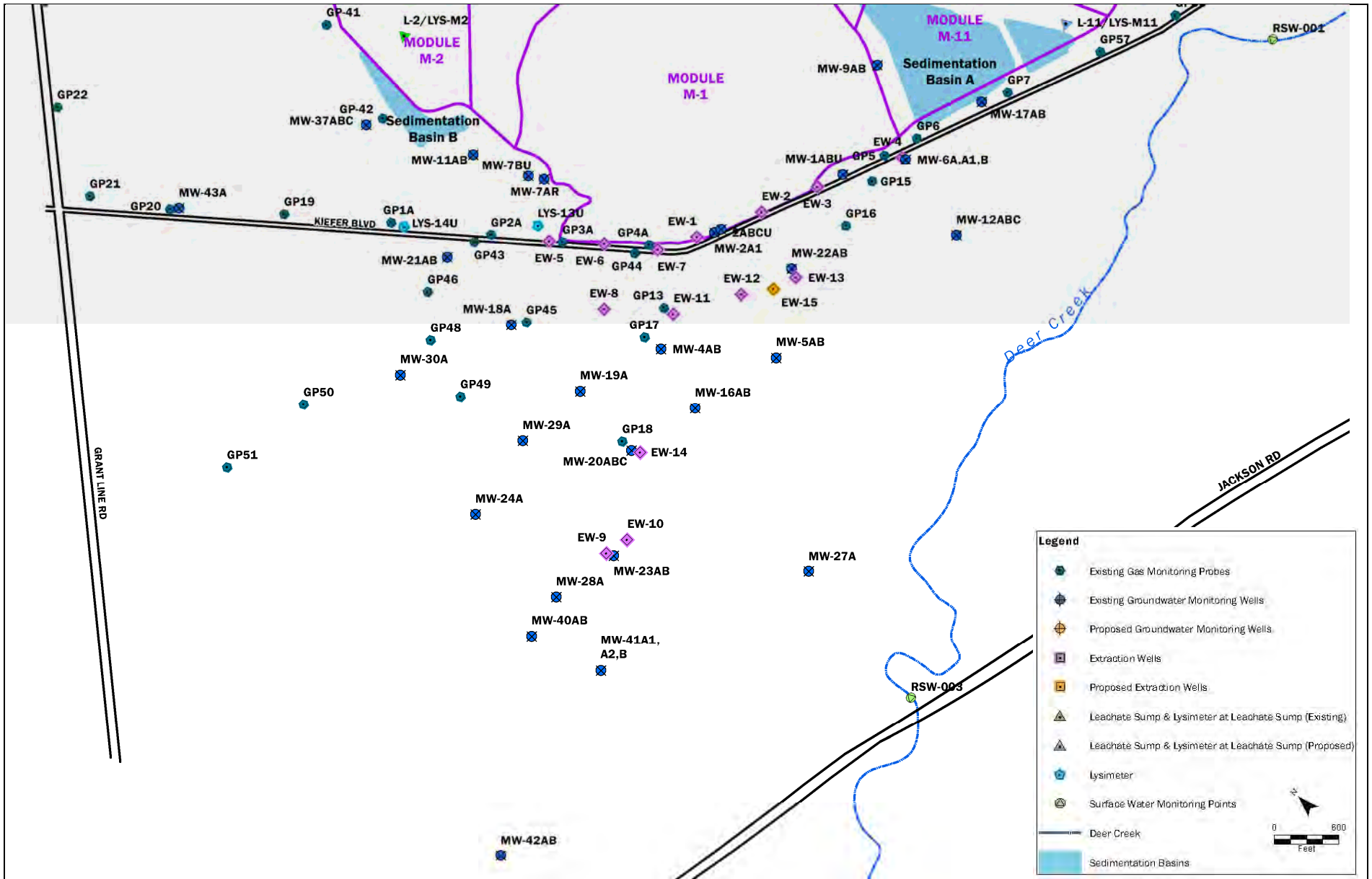
ANCILLARY FACILITIES

Sacramento County Waste Management/Recycling
 Kiefer Landfill
 Sacramento County



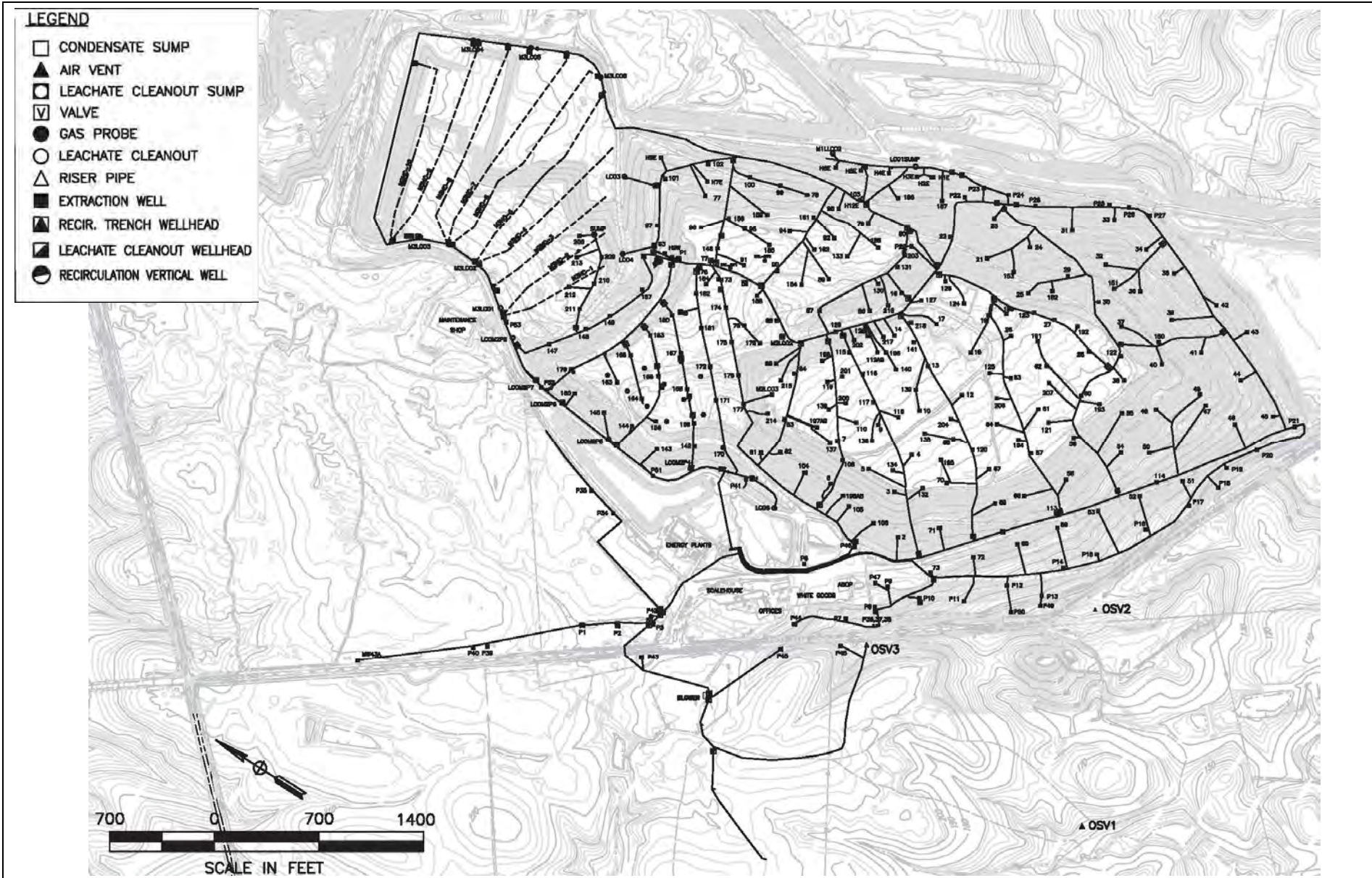
Drawing Reference:
2015 JTD, Figure 8
Brown and Caldwell

MONITORING NETWORK – NORTHEAST AREA
Sacramento County Waste Management/Recycling
Kiefer Landfill
Sacramento County



Drawing Reference:
2015 JTD, Figure 8
Brown and Caldwell

MONITORING NETWORK – SOUTHWEST AREA
Sacramento County Waste Management/Recycling
Kiefer Landfill
Sacramento County



Drawing Reference:
 Landfill Gas Monitoring & Control Plan
 Figure 6, Sacramento County

LANDFILL GAS COLLECTION SYSTEM
 Sacramento County Waste Management/Recycling
 Kiefer Landfill
 Sacramento County

INFORMATION SHEET

ORDER R5-2016-0013
COUNTY OF SACRAMENTO
DEPARTMENT OF WASTE MANAGEMENT AND RECYCLING
KIEFER LANDFILL, CLASS III LANDFILLS

SACRAMENTO COUNTY; KIEFER LANDFILL, SLOUGHOUSE; Sacramento County

The Kiefer Landfill is a Class III municipal solid waste (MSW) disposal facility located at 12701 Kiefer Blvd in Sloughouse, California. Kiefer Landfill is owned and operated by the County of Sacramento, Municipal Services Agency (Discharger). The landfill accepts approximately 750,000 tons of non-hazardous and municipal solid waste per year from areas within Sacramento County. The total permitted landfill footprint of 660 acres consists of 225-acre Landfill Unit 1 comprising of Modules M-1 and M-1L, and 435-acre Landfill Unit 2 comprising of Modules M-2 and M-3, and future Modules M-4 through M-11. Module M-1 is unlined, Module M-1L has a single composite liner system, and Modules M-2 and M-3 have single composite liner systems on the side slopes, and a double composite liner system on the base. Future Modules M-4 through M-11 shall be constructed with single composite liner systems on the side slopes, and a double composite liner system on the base.

On 22 September 2015, the Discharger submitted an amended Report of Waste Discharge (ROWD) as part of the Joint Technical Document (JTD) for the landfill. The information in the submitted documents has been used in revising these waste discharge requirements (WDRs). The ROWD/JTD and supporting documents contain information related to this revision of the WDRs including:

- a. Discharge of Groundwater Extraction and Treatment Plant water to an infiltration basin.
- b. Injection of limited quantities of Hydrogen Release Compound as a pilot project to assess the effectiveness of reducing Volatile Organic Compounds (VOCs) concentrations in groundwater.
- c. Revisions to the Detection Monitoring Program.

AAH/WMH

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

STANDARD PROVISIONS AND REPORTING REQUIREMENTS
FOR
WASTE DISCHARGE REQUIREMENTS
FOR
NONHAZARDOUS SOLID WASTE DISCHARGES
REGULATED BY SUBTITLE D AND/OR TITLE 27
(40 C.F.R. section 258 and Title 27, § 20005 et seq.)

December 2015

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A. APPLICABILITY

1. These Standard Provisions and Reporting Requirements (SPRRs) are applicable to nonhazardous solid waste disposal sites that are regulated by the Central Valley Regional Water Quality Control Board (hereafter, Central Valley Water Board) pursuant to the provisions of California Code of Regulations, title 27 ("Title 27"), section 20005 et seq., and municipal solid waste (MSW) landfills that are subject to the Federal Subtitle D regulations contained in 40 Code of Federal Regulations section 258 (hereafter, "Subtitle D" or "40 C.F.R. § 258.XX") in accordance with State Water Resources Control Board (State Water Board) Resolution 93-62. The Subtitle D regulations are only applicable to MSW landfills and therefore any requirements in these SPRRs that are referenced as coming from Subtitle D are not applicable to non-MSW waste management units such as Class II surface impoundments, Class II waste piles, and non-MSW landfill units. All Subtitle D requirements in these SPRRs are referenced with "[40 C.F.R. § 258.XX]" after the requirement.
2. "Order," as used throughout this document, means the Waste Discharge Requirements (WDRs) to which these SPRRs are incorporated.
3. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, and do not protect the Discharger from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.
4. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.
5. If there is any conflicting or contradictory language between the WDRs, the Monitoring and Reporting Program (MRP), or the SPRRs, then language in the WDRs shall govern over either the MRP or the SPRRs, and language in the MRP shall govern over the SPRRs.
6. If there is a site-specific need to change a requirement in these SPRRs for a particular landfill facility, the altered requirement shall be placed in the appropriate section of the WDRs and will supersede the corresponding SPRRs requirement. These SPRRs are standard and cannot be changed as part of the permit writing process or in response to comments, but they will be periodically updated on an as-needed basis.
7. Unless otherwise stated, all terms are as defined in Water Code section 13050 and in Title 27, section 20164.

B. TERMS AND CONDITIONS

1. Failure to comply with any waste discharge requirement, monitoring and reporting requirement, or Standard Provisions and Reporting Requirement, or

other order or prohibition issued, reissued, or amended by the Central Valley Water Board or the State Water Board, or intentionally or negligently discharging waste, or causing or permitting waste to be deposited where it is discharged into the waters of the state and creates a condition of pollution or nuisance, is a violation of this Order and the Water Code, which can result in the imposition of civil monetary liability [Wat. Code, § 13350(a)]

2. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to [Wat. Code, § 13381]:
 - a. Violation of any term or condition contained in this Order;
 - b. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;
 - c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge; or
 - d. A material change in the character, location, or volume of discharge.
3. Before initiating a new discharge or making a material change in the character, location, or volume of an existing discharge, the Discharger shall file a new report of waste discharge (ROWD), or other appropriate joint technical document (JTD), with the Central Valley Water Board [Wat. Code, § 13260(c) and § 13264(a)]. A material change includes, but is not limited to, the following:
 - a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;
 - b. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment);
 - c. A change in the type of waste being accepted for disposal; or
 - d. A change to previously-approved liner systems or final cover systems that would eliminate components or reduce the engineering properties of components.
4. Representatives of the Central Valley Water Board may inspect the facilities to ascertain compliance with the waste discharge requirements. The inspection shall be made with the consent of the owner or possessor of the facilities or, if the consent is refused, with a duly issued warrant. However, in the event of an emergency affecting the public health or safety, an inspection may be made without consent or the issuance of a warrant [Wat. Code, §13267(c)].

5. The Central Valley Water Board will review this Order periodically and will revise these waste discharge requirements when necessary [Wat. Code, § 13263(e) and Title 27, § 21720(b)].
6. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Central Valley Water Board [Wat. Code, § 13267(b)]. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.
7. A discharge of waste into the waters of the state is a privilege, not a right. No discharge of waste into waters of the state, whether or not the discharge is made pursuant to waste discharge requirements, shall create a vested right to continue the discharge [Wat. Code, § 13263(g)].
8. Technical and monitoring reports specified in this Order are requested pursuant to the Water Code [§13267(b)]. Failure to furnish the reports by the specified deadlines or falsifying information in the reports, are misdemeanors that may be liable civilly in accordance with §13268(b) of the Water Code [Wat. Code, §13268(a)].

C. STANDARD PROHIBITIONS

1. The discharge of liquid or semi-solid waste (waste containing less than 50 percent solids) is prohibited, except for the following when proposed in the ROWD/JTD and approved by this Order:
 - a. Dewatered sewage or water treatment sludge as described in Title 27, section 20220(c) provided it is discharged above a composite liner with a leachate collection and removal system (LCRS) [Title 27, § 20200(d)(3)].
 - b. Leachate and/or landfill gas condensate that is returned to the composite-lined waste management unit (with an LCRS) from which it came [Title 27, § 20340(g) and 40 C.F.R. § 258.28].
2. The discharge of wastes which have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products, which, in turn:
 - a. require a higher level of containment than provided by the unit; or
 - b. are 'restricted wastes'; or
 - c. impair the integrity of containment structures;is prohibited [Title 27, § 20200(b)].

3. The discharge of wastes outside of a waste management unit or portions of a unit specifically designed for their containment is prohibited.
4. The discharge of solid waste containing free liquid or which may contain liquid in excess of the moisture holding capacity as a result of waste management operations, compaction or settlement is prohibited.
5. The discharge of waste to a closed landfill unit is prohibited.
6. The discharge of waste constituents to the unsaturated zone or to groundwater is prohibited.
7. The discharge of solid or liquid waste or leachate to surface waters, surface water drainage courses, or groundwater is prohibited.

D. STANDARD DISCHARGE SPECIFICATIONS

1. The Discharger is responsible for accurate characterization of wastes, including a determination of whether or not wastes will be compatible with containment features and other wastes at the waste management unit and whether or not the wastes are required to be managed as a hazardous waste [Title 27, § 20200(c)] or designated waste [Title 27, § 20210].
2. Leachate and landfill gas condensate collected from a waste management unit shall be discharged to the unit from which it came, or discharged to an appropriate waste management unit in accordance with Title 27 and in a manner consistent with the waste classification of the liquid [Title 27, § 20200(d) and § 20340(g)].
3. The discharge of leachate or landfill gas condensate is restricted to those portions of a waste management unit that has a composite liner system and LCRS meeting the Federal Subtitle D requirements [40 C.F.R. § 258.28].
4. Leachate and condensate returned to a composite-lined landfill unit (when approved by this Order) shall be discharged and managed such that it does not cause instability of the waste, does not cause leachate seeps, does not generate additional landfill gas that is not extracted from the landfill by an active landfill gas extraction system, does not cause contaminants to enter surface water runoff, and does not cause leachate volumes to exceed the maximum capacity of the LCRS.
5. Any discharge of waste outside the portion of the landfill that was already covered with waste as of the landfill unit's respective Federal Deadline constitutes a "lateral expansion" and requires the installation of an approved composite liner system and LCRS [40 C.F.R. § 258.40(b)].

6. Wastes shall be discharged only into waste management units specifically designed for their containment and/or treatment, as described in this Order.
7. The discharge shall remain within the designated disposal area at all times.
8. The discharge of waste shall not cause a nuisance condition [Wat. Code, § 13050(m)].

E. STANDARD FACILITY SPECIFICATIONS

1. All waste management units shall be designed, constructed, and operated to ensure that wastes, including leachate, will be a minimum of 5 feet above the highest anticipated elevation of underlying groundwater [Title 27, § 20240(c)], including the capillary fringe.
2. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit [Title 27, § 20365(e)].
3. Interim cover is daily and intermediate cover [Title 27, § 20750(a)]. Interim cover over wastes discharged to a landfill shall be designed and constructed to minimize percolation of liquids through the wastes [Title 27, § 20705(b)].
4. Intermediate cover consisting of compacted earthen material of at least twelve (12) inches shall be placed on all surfaces of the fill where no additional solid waste will be deposited within **180 days** [Title 27, § 20700(a)].
5. During wet weather conditions, the facility shall be operated and graded to minimize leachate generation.
6. The Discharger shall **immediately** notify the Central Valley Water Board staff of any slope failure occurring at a waste management unit. Any failure which threatens the integrity of containment features or the waste management unit shall be promptly corrected in accordance with an approved method [Title 27, § 21710(c)(2)].
7. The Discharger shall **immediately** notify Central Valley Water Board staff of any flooding, unpermitted discharge of waste off-site or outside of waste management units, equipment failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.
8. The Discharger shall limit water used for facility maintenance within landfill areas to the minimum amount necessary for dust control and construction.
9. The Discharger shall maintain in good working order any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.

10. The Discharger shall lock all groundwater monitoring wells with a lock on the well cap or monitoring well box. All monitoring devices shall be clearly labeled with their designation including all monitoring wells, LCRS risers, and lysimeter risers and shall be easily accessible for required monitoring by authorized personnel. Each monitoring device shall be clearly visible and be protected from damage by equipment or vehicles.
11. The Discharger shall ensure that methane and other landfill gases are adequately vented, removed from landfill units, or otherwise controlled to prevent the danger of adverse health effects, nuisance conditions, degradation, or the impairment of the beneficial uses of surface water or groundwater due to migration through the unsaturated zone.
12. The Discharger shall maintain the depth of the fluid in the sump of each landfill unit at the minimum needed for efficient pump operation (the depth at which the pump turns on given the pump intake height and maximum pump cycle frequency).
13. The depth of fluid on the landfill liner shall not exceed **30 centimeters** (cm) [40 C.F.R. § 258.40(a)(2)]. This regulation is interpreted by the Central Valley Water Board to exclude the leachate sump. The Discharger shall **immediately** notify the Central Valley Water Board staff by telephone, and follow up in writing within **seven** days if monitoring reveals that the depth of fluid on any portion of the liner (excluding the sump) exceeds 30 cm (approximately 12 inches). The written notification shall include a timetable for remedial or corrective action necessary to achieve compliance with the leachate depth limitation.
14. Each LCRS shall be tested at least annually to demonstrate proper operation. The results of the tests shall be compared with earlier tests made under comparable conditions [Title 27, § 20340(d)].
15. The Discharger shall maintain a *Storm Water Pollution Prevention Plan and Monitoring Program and Reporting Requirements* in accordance with State Water Board Order No. 2014-0057-DWQ (Industrial General Permit) or most recent general industrial storm water permit), or retain all storm water on-site.
16. Internal site drainage from surface or subsurface sources shall not contact or percolate through wastes.
17. New MSW landfill units or lateral expansions of existing units shall not be sited in a "wetland" [as defined in 40 C.F.R. § 232.29(r)] unless there is no practical alternative; steps have been taken to assure no net loss of wetland; the landfill unit will not degrade the wetland; the unit will not jeopardize threatened or endangered species or produce adverse modification of a critical habitat or violate any requirement of the Marine Protection, Research, and Sanctuaries Act of 1972 [40 C.F.R. § 258.12].

F. STANDARD CONSTRUCTION SPECIFICATIONS

1. The Discharger shall submit for review and approval at least **90 days** prior to proposed construction, design plans and specifications for new landfill modules that include the following:
 - a. Detailed construction drawings showing all required liner system components, the LCRS, leachate sump, unsaturated zone monitoring system, any proposed landfill gas monitoring and extraction points, and access to the LCRS for required annual testing.
 - b. A Construction Quality Assurance (CQA) Plan prepared by a California-registered civil engineer or certified engineering geologist, and that meets the requirements of Title 27, section 20324.
 - c. A geotechnical evaluation of the area soils, evaluating their use as the base layer or reference to the location of this information in the ROWD/JTD [Title 27, § 21750(f)(4)].
 - d. Information about the seismic design of the proposed new module (or reference to the location of this information in the ROWD/JTD) in accordance with Title 27, section 20370.
 - e. A revised water quality monitoring plan for groundwater detection monitoring (or information showing the existing plan is adequate) in accordance with Title 27, section 20415.
 - f. An Operation Plan (or reference to the location of this information in the ROWD/JTD) meeting the requirements of Title 27, section 21760(b).
2. All containment structures shall be designed by, and construction shall be supervised by, a California registered civil engineer or a certified engineering geologist, and shall be certified by that individual as meeting the prescriptive standards, or approved engineered alternative design, in accordance with this Order prior to waste discharge.
3. The Discharger shall not proceed with construction until the construction plans, specifications, and all applicable construction quality assurance plans have been approved. Waste management units shall receive a final inspection and approval of the construction by Central Valley Water Board staff before use of the unit commences [Title 27, § 20310(e)].
4. Any report, or any amendment or revision of a report, that proposes a design or design change that might affect a waste management unit's containment features or monitoring systems shall be approved by a California registered civil engineer or a certified engineering geologist [Title 27, § 21710(d)].

5. Materials used in containment structures shall have appropriate chemical and physical properties to ensure that such structures do not fail to contain waste because of pressure gradients, physical contact with waste or leachate, chemical reactions with soil or rock, climatic conditions, the stress of installation, or because of the stress of daily operations [Title 27, § 20320(a)].
6. Waste management units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding, infiltration, inundation, erosion, slope failure, washout, and overtopping [Title 27, § 20365(a)].
7. The Discharger shall design storm water conveyance systems for Class III units for a 100-year, 24-hour storm event, and shall design storm water conveyance systems for Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].
8. All Class III landfill units shall be designed to withstand the maximum probable earthquake and Class II waste management units shall be designed to withstand maximum credible earthquake without damage to the foundation or to the structures that control leachate, or surface drainage, or erosion, or gas [Title 27, § 20370(a)].
9. The Discharger shall perform stability analyses that include components to demonstrate the integrity of the landfill foundation, final slopes, and containment systems under both static and dynamic conditions throughout the landfill's life including the closure period and post-closure maintenance period [Title 27, § 21750(f)(5)].
10. New waste management units and expansions of existing units shall not be located on a known Holocene fault [Title 27, § 20260(d)].
11. Liners shall be designed and constructed to contain the fluid, including landfill gas, waste, and leachate [Title 27, § 20330(a)].
12. Hydraulic conductivities shall be determined primarily by appropriate field test methods in accordance with accepted civil engineering practice. The results of laboratory tests with both water and leachate, and field tests with water, shall be compared to evaluate how the field permeabilities will be affected by leachate. It is acceptable for the Discharger to use appropriate compaction tests in conjunction with laboratory hydraulic conductivity tests to determine field permeabilities as long as a reasonable number of field hydraulic conductivity tests are also conducted [Title 27, § 20320(c)].
13. Hydraulic conductivities specified for containment structures other than the final cover shall be relative to the fluids (leachate) to be contained. Hydraulic conductivities for the final cover shall be relative to water [Title 27, § 20320(b)].

14. A test pad for each barrier layer and final cover shall be constructed in a manner duplicating the field construction. Test pad construction methods, with the designated equipment, shall be used to determine if the specified density/moisture-content/hydraulic conductivity relationships determined in the laboratory can be achieved in the field with the compaction equipment to be used and at the specified lift thickness [Title 27, § 20324(g)(1)(A)].
15. Performance requirements for geosynthetic membranes shall include, but are not limited to, a need to limit infiltration of water, to the greatest extent possible; a need to control landfill gas emissions; mechanical compatibility with stresses caused by equipment traffic, and for final covers the result of differential settlement over time and durability throughout the post-closure maintenance period [Title 27, § 20324(i)(1)].
16. The Discharger shall ensure proper preparation of the subgrade for any liner system that includes a GCL so as to provide a smooth surface that is free from rocks, sticks, or other debris that could damage or otherwise limit the performance of the GCL.
17. The Discharger shall propose an electronic leak location survey of the top liner for any new landfill module in the construction quality assurance plan unless the Discharger demonstrates that a leak location survey is not needed.
18. Leachate collection and removal systems are required for Class II landfills and surface impoundments, MSW landfills, and for Class III landfills which have a liner or which accept sewage or water treatment sludge [Title 27, § 20340(a)].
19. All new landfill units or lateral expansions of existing units that require a LCRS shall have a blanket-type LCRS that covers the bottom of the unit and extends as far up the sides as possible. The LCRS shall be of sufficient strength and thickness to prevent collapse under the pressures exerted by overlying wastes, waste cover materials, and by any equipment used at the unit [Title 27, § 20340(e)].
20. The LCRS shall be designed, constructed, maintained, and operated to collect and remove twice the maximum anticipated daily volume of leachate from the waste management unit [Title 27, § 20340(b)].
21. Leachate collection and removal systems shall be designed and operated to function without clogging through the scheduled closure of the landfill unit and during the post-closure maintenance period.
22. The LCRS shall be designed to maintain the depth of fluid over any portion of the LCRS of no greater than 30 cm [40 C.F.R. § 258.40(a)(2)], excluding the leachate sump. The leachate sump, leachate removal pump, and pump controls shall be designed and set to maintain a fluid depth no greater than the minimum needed for efficient pump operation [Title 27, § 20340(c)].

23. All construction of liner systems and final cover systems shall be performed in accordance with a Construction Quality Assurance Plan certified by a registered civil engineer or a certified engineering geologist [Title 27, § 20323].
24. The Construction Quality Assurance program shall be supervised by a registered civil engineer or a certified engineering geologist who shall be designated the CQA officer [Title 27, § 20324(b)(2)].
25. The Discharger shall ensure that a third party independent of both the Discharger and the construction contractor performs all of the construction quality assurance monitoring and testing during the construction of a liner system.
26. The Discharger shall notify Central Valley Water Board staff at least **14 days** prior to commencing field construction activities including construction of a new lined cell or module, construction of a final cover, or any other construction that requires Central Valley Water Board staff approval under this Order.
27. The Discharger shall submit for review and approval at least **60 days** prior to proposed discharge, final documentation required in Title 27 Section 20324(d)(1)(C) following the completion of construction of a new lined landfill module. The report shall be certified by a registered civil engineer or a certified engineering geologist and include a statement that the liner system was constructed in accordance with the approved design plans and specifications, the CQA Plan, the requirements of the WDRs, and that it meets the performance goals of Title 27. The report shall contain sufficient information and test results to verify that construction was in accordance with the design plans and specifications, the construction quality assurance plan, and the performance goals of Title 27.
28. The Discharger shall not discharge waste onto a newly constructed liner system until the final documentation report has been reviewed and an acceptance letter has been received.
29. Prior to placement of waste in a new landfill unit, the Discharger shall monitor any pan lysimeter for the unit that has received enough rainfall to flood the LCRS sump. If liquid is detected in the pan lysimeter, the Discharger shall verify that the liquid is not from a leak in the primary liner system before waste can be accepted to the new module.

G. STANDARD CLOSURE AND POST-CLOSURE SPECIFICATIONS

1. The Discharger shall submit a final or partial final closure and post-closure maintenance plan at least **two years** prior to the anticipated date of closure [Title 27, § 21780(d)(1)].

2. The Discharger shall notify the Central Valley Water Board in writing that a landfill unit or portion of a unit is to be closed either at the same time that the California Department of Resources Recycling and Recovery (CalRecycle) is notified or **180 days** prior to beginning any final closure activities, whichever is sooner [Title 27, § 21710(c)(5)(A)]. The notice shall include a statement that all closure activities will conform to the most recently approved final or partial final closure plan and that the plan provides for site closure in compliance with all applicable federal and state regulations [Title 27, § 21710(c)(5)(C)].
3. Initiation of closure activities shall begin within **30 days** of final waste receipt, or within **one year** of receipt of most recent waste if additional capacity remains [40 C.F.R. § 258.60(f)].
4. Closure activities shall be completed within **180 days** of the beginning of closure activities unless an extension is granted by the Executive Officer [40 C.F.R. § 258.60(g)].
5. The Discharger shall carry out both mandatory closure and normal closure of a waste management unit or a portion of a unit in accordance with a closure and post-closure maintenance plan approved by the Central Valley Water Board [Title 27, § 20950(a)(1)] through the issuance of closure waste discharge requirements.
6. The Discharger shall notify the Central Valley Water Board that a preliminary closure and post-closure maintenance plan has been prepared and placed in the operating record by the date of initial receipt of waste at any new MSW landfill unit or lateral expansion of any existing unit [40 C.F.R. § 258.60(d)]. This notification shall be included in the cover letter transmitting the preliminary closure and post-closure maintenance plan.
7. In addition to the applicable provisions of Title 27, the preliminary closure and/or the post-closure maintenance plans for MSW landfill units shall include the following:
 - a. A description of the steps necessary to close all MSW landfill units at any point during their active life in accordance with the cover design requirements [40 C.F.R. § 258.60(c)];
 - b. An estimate of the largest area of the landfill unit(s) ever requiring a final cover at any time during the active life of the unit(s) [40 C.F.R. § 258.60(c)(2)];
 - c. An estimate of the maximum inventory of wastes ever on-site over the active life of the waste management facility [40 C.F.R. § 258.60(c)(3)]; and
 - d. A schedule for completing all activities necessary to satisfy the closure criteria in 40 C.F.R. section 258.60 [40 C.F.R. § 258.60(c)(4)].

8. The final closure and post-closure maintenance plan for the waste management unit shall include at least the following: an itemized cost analysis, closure schedule, any proposed final treatment procedures, map, changes to the unit description presented in the most recent ROWD, federal requirements for a MSW facility, land use of the closed unit, and a construction quality assurance plan [Title 27, § 21769(c) & (d)].
9. Closure of each waste management unit shall be under the direct supervision of a registered civil engineer or certified engineering geologist [Title 27, § 20950(b)].
10. The final cover of closed landfills shall be designed, graded, and maintained to prevent ponding and soil erosion due to high run-off velocities [Title 27, § 21090(b)(1)(A)].
11. The final grading design shall be designed and approved by a registered civil engineer or certified engineering geologist [Title 27, § 21090(b)(1)(C)].
12. All final cover designs shall include a minimum 1-foot thick erosion resistant layer [Title 27, § 21090(a)(3)(A)].
13. The Discharger shall close the landfill with minimum 15-foot wide benches every 50 vertical feet [Title 27, § 21090(a)].
14. Final cover slopes shall not be steeper than a horizontal to vertical ratio of one and three quarters to one and designs having any slopes steeper than a horizontal to vertical ratio of three to one, or having a geosynthetic component, shall have these aspects of their design specifically supported in the slope stability report required in Title 27, section 21750(f)(5) [Title 27, § 21090(a)].
15. For any portions of the final cover installed after July 18, 1997, for which the Central Valley Water Board has not approved a slope and foundation stability report on or before that date, the Discharger shall meet the requirements of Title 27, section 21750(f)(5) [Title 27, § 21090(a)(6)].
16. Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by wind or water shall be designed and constructed to prevent such erosion [Title 27, § 21090(b)(2)].
17. The Discharger shall design storm water conveyance systems for closed Class III units for a 100-year, 24-hour storm event, and shall design storm water conveyance systems for closed Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].
18. Closed landfill units shall be provided with at least two permanent surveying monuments, installed by a licensed land surveyor or by a registered civil engineer, from which the location and elevation of all wastes, containment

structures, and monitoring facilities can be determined throughout the post-closure maintenance period [Title 27, § 20950(d)].

19. Following closure of any MSW landfill units, the Discharger shall notify the Executive Officer that the deed to the landfill facility property, or some other instrument that is normally examined during a title search, has been recorded and a copy placed in the operating record. The notation on the deed shall in perpetuity notify any potential purchaser of the property that the land has been used as a landfill facility and that use of the land is restricted to the planned use described in the post-closure maintenance plan [Title 27, § 20515(a)(4) and §21170, and 40 C.F.R. § 258.60(i)].
20. Construction or repair of the final cover system's low-hydraulic conductivity layer is to be carried out in accordance with an approved construction quality assurance plan [Title 27, § 21090(b)(1)(E)].
21. The Discharger shall incorporate into the closure and post-closure maintenance plan a cover-integrity monitoring and maintenance program which includes at least the following: a periodic leak search, periodic identification of other problem areas, prompt cover repair, and vegetation maintenance [Title 27, § 21090(a)(4)].
22. The Discharger shall complete a final cover survey upon completion of closure activities for that portion of the landfill. The final cover surveys shall include an initial survey and map [Title 27, § 21090(e)(1). Every **five years**, the Discharger shall conduct a survey of the closed landfill cover and submit an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's low-hydraulic-conductivity layer [Title 27, § 21090(e)(2)].
23. Within **30 days** of completion of all closure activities, the Discharger shall certify that all closure activities were performed in accordance with the most recently approved final closure plan and CQA Plan, and in accordance with all applicable regulations. The Discharger shall also certify that closed landfill units shall be maintained in accordance with and approved post-closure maintenance plan [Title 27, § 21710(c)(6)].
24. Within **180 days** of completion of closure construction activities, the Discharger shall submit final documentation of closure, including the Certification of Closure. The closure documents shall include a final construction quality assurance report and any other documents necessary to support the certification [Title 27, § 21880].
25. The post-closure maintenance period shall continue until the Central Valley Water Board determines that wastes remaining in the landfill unit(s) no longer pose a threat to water quality [Title 27, § 20950(a)(1)].

26. The Discharger shall conduct a periodic leak search to monitor of the integrity of the final cover in accordance with the schedule in the approved final post-closure maintenance plan [Title 27, § 21090(a)(4)(A)].
27. The Discharger shall periodically inspect and identify problems with the final cover including areas that require replanting, erosion, areas lacking free drainage, areas damaged by equipment operations, and localized areas identified in the required five-year iso-settlement survey [Title 27, § 21090(a)(4)(B)].
28. The Discharger shall repair the cover promptly in accordance with a cover repair plan to be included in the final post-closure maintenance plan [Title 27, § 21090(a)(4)(C)].
29. Throughout the post-closure maintenance period, the Discharger shall maintain the structural integrity and effectiveness of all containment structures, maintain the final cover as necessary to correct the effects of settlement and other adverse factors, continue to operate the LCRS as long as leachate is generated and detected, maintain the monitoring systems, prevent erosion and related damage of the final cover due to drainage, and protect and maintain surveyed monuments [Title 27, § 21090(c)].
30. Post-closure maintenance shall be conducted for a minimum period of **30 years** or until the waste no longer poses a threat to environmental quality, whichever is greater [Title 27, § 21180(a) and Title 27, § 21900(a)].

H. STANDARD FINANCIAL ASSURANCE PROVISIONS

1. The Discharger shall establish an irrevocable fund for closure and post-closure maintenance to ensure closure and post-closure maintenance of each classified unit in accordance with an approved closure and post-closure maintenance plan [Title 27, § 20950(f) and § 22207(a)].
2. The Discharger shall obtain and maintain assurances of financial responsibility for initiating and completing corrective action for all known and reasonably foreseeable releases from the waste management unit [Title 27, §20380(b), § 22221, and § 22222].

I. STANDARD MONITORING SPECIFICATIONS

1. The water quality monitoring program shall include appropriate and consistent sampling and analytical procedures and methods designed to ensure that monitoring results provide a reliable indication of water quality at all monitoring points and background monitoring points [Title 27, § 20415(e)(4) and 40 C.F.R. § 258.53(b)].

2. All monitoring systems shall be designed and certified by a registered geologist or a registered civil engineer [Title 27, § 20415(e)(1)].
3. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport [Title 27, § 20415(b)(4)(A)].
4. All sample chemical analyses of any material shall be performed by a laboratory certified by the California Department of Health Services [Wat. Code, § 13176(a)].
5. A Detection Monitoring Program for a new landfill facility shall be installed, operational, and one year of monitoring data collected from background monitoring points prior to the discharge of wastes [Title 27, § 20415(e)(6)].
6. Background for water samples or soil-pore gas samples shall be represented by the data from all samples taken from applicable background monitoring points during that reporting period (at least one sample from each background monitoring point).
7. The Discharger shall submit for approval, establish, and maintain an approved Sample Collection and Analysis Plan. The Sample Collection and Analysis Plan shall at a minimum include:
 - a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;
 - b. Sample preservation information and shipment procedures;
 - c. Sample analytical methods and procedures;
 - d. Sample quality assurance/quality control (QA/QC) procedures;
 - e. Chain of Custody control; and
 - f. Sample analysis information including sample preparation techniques to avoid matrix interferences, method detection limits (MDLs), practical quantitation limits (PQLs) and reporting limits (RLs), and procedures for reporting trace results between the MDL and PQL.

If required by the Executive Officer, the Discharger shall modify the Sample Collection and Analysis Plan to conform with this Order.

8. For any given monitored medium, the samples taken from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be taken **within a span not to exceed 30 days**, unless a longer time period is approved, and shall be taken in a manner that

ensures sample independence to the greatest extent feasible. Specific methods of collection and analysis must be identified. Sample collection, storage, and analysis shall be performed according to the most recent version of USEPA Methods, such as the latest editions, as applicable, of: (1) Methods for the Analysis of Organics in Water and Wastewater (USEPA 600 Series), (2) Test Methods for Evaluating Solid Waste (SW-846, latest edition), and (3) Methods for Chemical Analysis of Water and Wastes (USEPA 600/4-79-020), and in accordance with the approved Sample Collection and Analysis Plan. Appropriate sample preparation techniques shall be used to minimize matrix interferences.

9. If methods other than USEPA-approved methods or Standard Methods are used, or there is a proposed alternant USEPA method than the one listed in the MRP, the proposed methodology shall be submitted for review and approval prior to use, including information showing its equivalence to the required method.
10. The **methods of analysis and the detection limits** used must be appropriate for the expected concentrations. For the monitoring of any constituent or parameter that is found in concentrations which produce more than 90% non-numerical determinations (i.e., "trace" or "ND") in data from background monitoring points for that medium, the analytical method having the lowest MDL shall be selected from among those methods which would provide valid results in light of any matrix effects or interferences.
11. The laboratory reporting limit (RL) for all reported monitoring data shall be set no greater than the practical quantitation limit (PQL).
12. **"Trace" results** - results falling between the MDL and the PQL - shall be reported as such, and shall be accompanied both by the estimated MDL and PQL values for that analytical run.
13. Laboratory data shall not be altered or revised by the Discharger. If the Discharger observes potential lab errors, it shall identify the issue in the monitoring report and shall describe steps that will be taken to prevent similar errors in the future.
14. **MDLs and PQLs** shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific analytical procedure and equipment used by the lab, rather than simply being quoted from USEPA analytical method manuals. In relatively interference-free water, laboratory-derived MDLs and PQLs are expected to closely agree with published USEPA MDLs and PQLs. MDLs and PQLs shall be reported.

15. If the laboratory suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged in the laboratory report accordingly, along with estimates of the detection limit and quantitation limit actually achieved. The **MDL shall always be calculated such that it represents the lowest achievable concentration associated with a 99% reliability of a nonzero result.** The PQL shall always be calculated such that it represents the lowest constituent concentration at which a numerical value can be assigned with reasonable certainty that it represents the constituent's actual concentration in the sample. Normally, PQLs should be set equal to the concentration of the lowest standard used to calibrate the analytical procedure.
16. All **QA/QC data** shall be reported, along with the sample results to which they apply, including the method, equipment, analytical detection and quantitation limits, the percent recovery, an explanation for any recovery that falls outside the QC limits, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and signature of a responsible person from the laboratory. **Sample results shall be reported unadjusted for blank results or spike recoveries.** In cases where contaminants are detected in QA/QC samples (i.e., field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged, but the analytical results shall not be adjusted.
17. Unknown chromatographic peaks shall be reported, flagged, and tracked for potential comparison to subsequent unknown peaks that may be observed in future sampling events. Identification of unknown chromatographic peaks that recur in subsequent sampling events may be required.
18. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative groundwater samples [Title 27, § 20415(b)(4)(B)]. Groundwater samples shall not be field-filtered prior to laboratory analysis [40 C.F.R. § 258.53(b)]. Groundwater samples needing filtering (e.g., samples to be analyzed for dissolved metals) shall be filtered by the laboratory prior to analysis.
19. Groundwater elevations shall be measured in each well immediately prior to purging, each time groundwater is sampled. The owner or operator shall determine the rate and direction of groundwater flow each time groundwater is sampled. Groundwater elevations in wells which monitor the same waste management area shall be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude accurate determination of groundwater flow rate and direction [40 C.F.R. § 258.53(d)].
20. Monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design

specifications throughout the life of the monitoring program [40 C.F.R. § 258.51(c)(2)]. Monitoring devices that cannot be operated and maintained to perform to design specifications shall be replaced after review and approval of a report (i.e., work plan) for the proposed replacement devices.

21. All borings are to be logged during drilling under the direct supervision of a registered geologist or registered civil engineer with expertise in stratigraphic well logging [Title 27, § 20415(e)(2)].
22. Soils are to be described according to the Unified Soil Classification System [Title 27, § 20415(e)(2)(A)]. Rock is to be described in a manner appropriate for the purpose of the investigation [Title 27, § 20415(e)(2)(B)].
23. The Discharger shall submit a work plan for review and approval at least **60 days** prior to installation or abandonment of groundwater monitoring wells.
24. The Discharger shall provide Central Valley Water Board staff a minimum of **one week** notification prior to commencing any field activities related to the installation or abandonment of monitoring devices.
25. The water quality protection standard shall consist of the constituents of concern (COC), concentration limits, and the point of compliance. The water quality protection standard shall apply during the active life of the waste management unit, closure period, post-closure maintenance period, and any compliance period under Title 27, section 20410 [Title 27, § 20390].
26. The point of compliance at which the water quality protection standard applies is a vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit [Title 27, § 20405].
27. The compliance period is the minimum period of time during which the Discharger shall conduct a water quality monitoring program and is the number of years equal to the active life of the waste management unit plus the closure period [Title 27, § 20410(a)].
28. The groundwater monitoring system shall include a sufficient number of monitoring points, installed at appropriate locations, to yield groundwater samples from the uppermost aquifer that represent the quality of groundwater that has not been affected by a release from the waste management unit [Title 27, § 20415(b)(1)(A)].
29. The Detection Monitoring Program shall include a sufficient number of monitoring points, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of

groundwater passing the point of compliance to allow the detection of a release from the waste management unit [Title 27, § 20415(b)(1)(B)1.].

30. Additional monitoring points shall be added as necessary to provide the best assurance of the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)2.].
31. The Detection Monitoring Program shall also include a sufficient number of monitoring points installed at appropriate depths and locations to yield groundwater samples from other aquifers or perched zones not already monitored to provide the **earliest possible detection** of a release from the waste management unit [Title 27, § 20415(b)(1)(B)3. and 4., and §20420(b)].
32. A surface water monitoring system shall be established to monitor each surface water body that could be affected by a release from the waste management unit [Title 27, § 20415(c)].
33. An unsaturated zone monitoring system shall be established for each waste management unit [Title 27, § 20415(d)].
34. The Discharger shall notify Central Valley Water Board staff within **seven days** if fluid is detected in a previously dry LCRS, unsaturated zone monitoring system, or if a progressive increase is detected in the volume of fluid in a LCRS [Title 27, § 21710(c)(3)].
35. Driller's logs for all monitoring wells shall to be submitted to the Central Valley Water Board and the Department of Water Resources [Wat. Code, § 13751 and Title 27, § 20415(b)(3)].
36. Groundwater elevation, temperature, electrical conductivity, turbidity, and pH are to be accurately measured at each well each time groundwater is sampled [Title 27, § 21415(e)(13)].
37. The groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation being monitored shall be determined at least quarterly [Title 27, § 20415(e)(15)].
38. The Discharger shall graph all analytical data from each monitoring point and background monitoring point and shall submit the graphs to the Central Valley Water Board annually [Title 27, § 20415(e)(14)].
39. For each waste management unit, the Discharger shall collect all data necessary for selecting appropriate data analysis methods for establishing background values for each constituent of concern and for each monitoring parameter [Title 27, § 20420(c)]. The Discharger shall propose a data analysis method that includes a detailed description of the criteria to be used for

determining “measurably significant” (as defined in Title 27, section 20164) evidence of a release from the waste management unit and determining compliance with the water quality protection standard [Title 27, § 20415(e)(6) and (7)].

40. For statistical analysis of data, the Discharger shall use one of the methods described in Title 27, section 20415(e)(8)(A)-(E). A non-statistical data analysis method can be used if the method can achieve the goal of the particular monitoring program at least as well as the most appropriate statistical method [Title 27, § 20415(e)(8)]. The Discharger shall use a statistical or nonstatistical data analysis method that complies with Title 27, section 20415(e)(7, 8, 9, and 10), to compare the concentration of each constituent of concern or monitoring parameter with its respective background concentration to determine whether there has been a measurably significant evidence of a release from the waste management unit. For any given monitoring point at which a given constituent has already exhibited a measurably significant indication of a release at that monitoring point, the Discharger may propose to monitor the constituent, at that well, using a concentration-versus-time plot.
41. The Discharger may propose an alternate statistical method [to the methods listed under Title 27, section 20415(e)(8)(A-D)] in accordance with Title 27, section 20415(e)(8)(E), for review and approval.
42. The statistical method shall account for data below the practical quantitation limit (PQL) with one or more statistical procedures that are protective of human health and the environment. Any PQL validated pursuant to Title 27, section 20415(e)(7) that is used in the statistical method shall be **the lowest concentration (or value) that can be reliably achieved** within limits of precision and accuracy specified in the WDRs or an approved Sample Collection and Analysis Plan for routine laboratory operating conditions that are available to the facility. The Discharger’s technical report (Sample Collection and Analysis Plan and/or Water Quality Protection Standard Report), pursuant to Title 27, section 20415(e)(7), shall consider the PQLs listed in Appendix IX to Chapter 14 of Division 4.5 of Title 22, CCR, for guidance when specifying limits of precision and accuracy. For any given constituent monitored at a background or downgradient monitoring point, an indication that falls between the MDL and the PQL for that constituent (hereinafter called a “trace” detection) shall be identified and used in appropriate statistical or non-statistical tests. Nevertheless, for a statistical method that is compatible with the proportion of censored data (trace and ND indications) in the data set, the Discharger can use the laboratory’s concentration estimates in the trace range (if available) for statistical analysis, in order to increase the statistical power by decreasing the number of “ties”.
43. The water quality protection standard for organic compounds which are not naturally occurring and not detected in background groundwater samples shall

be taken as the detection limit of the analytical method used (e.g., USEPA methods 8260 and 8270).

44. Alternate statistical procedures may be used for determining the significance of analytical results for common laboratory contaminants (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate) if part of an approved water quality protection standard. Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Central Valley Water Board staff.
45. **Confirmation of Measurably Significant Evidence of a Release.** Whenever a constituent is detected at a detection monitoring point at a concentration that exceeds the concentration limit from the water quality protection standard, the Discharger shall conduct verification sampling to confirm if the exceedance is due to a release or if it is a false-positive (unless previous monitoring has already confirmed a release for that constituent at that monitoring point). An exceedance of the concentration limit from the water quality protection standard is considered measurably significant evidence of a release that must be either confirmed or denied. There are two separate verification testing procedures:
- a. Standard Monitoring Specification I.46 provides the procedure for analytes that are detected in less than 10% of the background samples such as non-naturally occurring constituents like volatile organic compounds; and
 - b. Standard Monitoring Specification I.47 provides the procedure for analytes that are detected in 10% or greater of the background samples such as naturally occurring constituents like chloride.
46. **Verification Procedure for Analytes Detected in Less than 10% of Background Samples.** The Discharger shall use the following non-statistical method for all analytes that are detected in less than 10% of the background samples. The non-statistical method shall be implemented as follows:
- a. **Initial Determination of Measurably Significant Evidence of a Release.** Identify each analyte in the **current** detection monitoring point sample that exceeds either its respective MDL or PQL, and for which a release has not been previously confirmed. The Discharger shall conclude that the exceedance provides a preliminary indication of a release or a change in the nature or extent of the release, at that monitoring point, if **either**:
 - 1) The data contains two or more analytes that equal or exceed their respective MDLs; or
 - 2) The data contains one or more analyte that equals or exceeds its PQL.

b. **Discrete Retest** [Title 27, § 20415(e)(8)(E) and § 20420(j)(1-3)]:

- 1) In the event that the Discharger or Central Valley Water Board staff concludes (pursuant to paragraph I.46.a., above) that there is a preliminary indication of a release, then the Discharger shall **immediately** notify Central Valley Water Board staff by phone or e-mail and, within **30 days** of such indication, shall collect two new (retest) samples from the monitoring point where the release is preliminarily indicated and analyze them for the constituents that caused the need for the retest.
- 2) **Confirmation of a Release.** As soon as the retest data are available, the Discharger shall conclude that measurably significant evidence of a release is confirmed if (not including the original sample) two or more analytes equal or exceed their respective MDLs or if one or more analyte equals or exceeds its PQL. The Discharger shall then:
 - a) **Immediately** verbally notify the Central Valley Water Board whether or not the retest confirmed measurably significant evidence of a release for the analyte at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of the verbal notification; and
 - b) Carry out the requirements of Section J, **RESPONSE TO A RELEASE** if a release has been confirmed.
 - c) Add any five-year analyte that is confirmed per this method to the monitoring parameter list such that it is monitored during each regular monitoring event.

47. **Verification Procedure for Analytes Detected in 10% or Greater of the Background Samples.** The Discharger shall use either a statistical or non-statistical method pursuant to Title 27, section 20415(e)(8)(E) for all analytes that are detected in 10% or greater of the background samples. The Discharger shall use one of the statistical methods required in Title 27, section 20415(e)(8)(E) unless another method has been proposed by the Discharger in a Water Quality Protection Standard Report (or equivalent report) and approved by the Central Valley Water Board in a Monitoring and Reporting Program pursuant to Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E). The method shall be implemented as follows:

- a. **Initial Determination of Measurably Significant Evidence of a Release.** The Discharger shall compare the value reported by the laboratory for each analyte to the statistically-derived concentration limit from the most recent report (Annual Monitoring Report or Water Quality Protection Standard Report) that uses the approved statistical procedure. If the value exceeds the concentration limit for that constituent, the Discharger shall conclude that there is measurably significant evidence of a release [Title 27, § 20420(i)].

b. **Retest Method** [Title 27, § 20415(e)(8)(E) and § 20420(j)(1-3)].

- 1) In the event that the Discharger or Central Valley Water Board staff concludes (pursuant to paragraph I.47.a., above) that there is a preliminary indication of a release, then the Discharger shall **immediately** notify Central Valley Water Board staff by phone or e-mail and, within **30 days** [Title 27, § 20415(e)(3)] of such indication, the Discharger shall implement a verification procedure/retest option, in accordance with Title 27, sections 20415(e)(8)(E) and 20420(j)(2). The verification procedure shall include either a single “composite” retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release) or shall consist of at least two “discrete” retests (i.e., statistical analyses each of which analyzes only newly-acquired data from the monitoring point that indicated a release) [Title 27, § 20415(e)(8)(E)]. The Discharger may use an alternate method previously approved by the Central Valley Water Board and included in the Monitoring and Reporting Program. The verification procedure shall comply with the requirements of Title 27, section 20415(e)(8)(E) in addition to the performance standards of Title 27, section 20415(e)(9). The retest samples shall be collected from the monitoring point where the release is preliminarily indicated and shall be analyzed for the constituents that caused the need for the retest. For any indicated monitoring parameter or constituent of concern, if the retest results of one or more of the retest data suites confirm the original indication, the Discharger shall conclude that measurably significant evidence of a release has been confirmed.
- 2) **Confirmation of a Release.** As soon as the retest data are available, the Discharger shall evaluate the results pursuant to paragraph I.47.b.1, above and shall:
 - a) **Immediately** verbally notify the Central Valley Water Board whether or not the retest confirmed measurably significant evidence of a release for the analyte at the monitoring point, and follow up with written notification submitted by certified mail **within seven days** of the verbal notification; and
 - b) Carry out the requirements of Section J, **RESPONSE TO A RELEASE** if a release has been confirmed.
 - c) Add any five-year analyte that is confirmed per this method to the monitoring parameter list such that it is monitored during each regular monitoring event.

48. Physical Evidence of a Release. If the Discharger determines that there is a significant **physical** evidence of a release, the Discharger shall immediately

verbally notify Central Valley Water Board staff and provide written notification **by certified mail within 7 days** of such determination, and within **90 days** shall submit an amended report of waste discharge to establish an Evaluation Monitoring Program [Title 27, § 20385(a)(3) and § 20420(l)(1) & (2)].

J. RESPONSE TO A RELEASE

1. **Measurably Significant Evidence of a Release Has Been Confirmed.** If the Discharger has confirmed that there is measurably significant evidence of a release from a waste management unit pursuant to Standard Monitoring Specification I.46 or I.47, then the Discharger shall:
 - a. **Immediately** sample all monitoring points in the affected medium at that waste management unit and determine the concentration of all monitoring parameters and constituents of concern for comparison with established concentration limits. Because this constituent of concern scan does not involve statistical testing, the Discharger will need to collect and analyze only a single water sample from each monitoring point in the affected medium [Title 27, § 20420(k)(1)].
 - b. **Within 14 days** of confirming measurably significant evidence of a release, the Discharger shall (for releases from MSW landfill units) notify all persons who own the land or reside on the land that directly overlies any portion of the plume of contamination if contaminants have migrated off-site if indicated by sampling of detection monitoring wells [40 C.F.R. § 258.55(g)(1)(iii)].
 - c. **Within 90 days** of confirming measurably significant evidence of a release, the Discharger shall submit an amended report of waste discharge to establish an Evaluation Monitoring Program meeting the requirements of Title 27, sections 20420(k)(5)(A-D), including but not limited to the results of sampling pursuant to paragraph J.1.a, above. The Evaluation Monitoring Program shall be designed for the collection and analysis of all data necessary to assess the nature and extent of the release and to determine the spatial distribution and concentration of each constituent throughout the zone affected by the release [Title 27, § 20420(k)(5) and § 20425(b)]. For releases from MSW landfill units, the Evaluation Monitoring Program shall also include any additional proposals necessary to comply with 40 C.F.R. § 258.55, particularly the additional monitoring well required by 40 C.F.R. § 258.55(g)(1)(ii).
 - d. **Within 180 days** of confirming measurably significant evidence of a release, the Discharger shall submit to the Central Valley Water Board an initial engineering feasibility study for a Corrective Action Program necessary to meet the requirements of Title 27, section 20430. At a minimum, the initial engineering feasibility study shall contain a detailed

description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern [Title 27, § 20420(k)(6)].

- e. If the Discharger confirms that there is measurably significant evidence of a release from the waste management unit at any monitoring point, the Discharger may attempt to demonstrate that a source other than the waste management unit caused the evidence of a release or that the evidence is an artifact caused by an error in sampling, analysis, or statistical evaluation or by natural variation in groundwater, surface water, or the unsaturated zone. The Discharger may make a demonstration pursuant to Title 27, section 20420(k)(7) in addition to or in lieu of submitting both an amended report of waste discharge or an engineering feasibility study; however, the Discharger is not relieved of the requirements and due dates of Title 27, sections 20420(k)(6) & (7) unless Central Valley Water Board staff agree that the demonstration successfully shows that a source other than the waste management unit caused the evidence of a release or that the evidence resulted from error in sampling, analysis, or statistical evaluation or from natural variation in groundwater, surface water, or the unsaturated zone. In order to make this demonstration, the Discharger shall notify the Central Valley Water Board by certified mail of the intent to make the demonstration **within seven days** of determining measurably significant evidence of a release, and shall submit a report **within 90 days** of determining measurably significant evidence of a release [Title 27, § 20420(k)(7)].
- f. **Within 90 days** of the date that the Evaluation Monitoring Program from paragraph J.1.c is approved (the date is it established), the Discharger shall complete and submit the following:
 - i) **Results and Assessment for the Evaluation Monitoring Program.** A report with the results and assessment based on the approved Evaluation Monitoring Program [Title 27, § 20425(b)].
 - ii) **Updated Engineering Feasibility Study.** An updated engineering feasibility study for corrective action based on the data collected to delineate the release and data from the ongoing monitoring program required under Title 27, section 20425(e) [Title 27, § 20425(c)].
 - iii) **Amended ROWD for a Corrective Action Program.** An amended report of waste discharge to establish a Corrective Action Program meeting the requirements of Title 27, section 20430 based on the data collected to delineate the release and based on the updated engineering feasibility study [Title 27, § 20425(d)].

- g. The Discharger shall (for releases from MSW landfill units) discuss the results of the updated engineering feasibility study, prior to the final selection of a remedy, in a public meeting with interested and affected parties [40 C.F.R. § 258.56(d)].

K. GENERAL PROVISIONS

1. In the event the Discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Discharger shall notify the appropriate Central Valley Water Board office by telephone **as soon as** it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing **within two weeks**. The written notification shall state the nature, time, and cause of noncompliance, and shall describe the measures being taken to prevent recurrences and shall include a timetable for corrective actions.
2. All reports and transmittal letters shall be signed by persons identified below:
 - a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
 - d. A duly authorized representative of a person designated in a, b or c above if:
 - 1) The authorization is made in writing by a person described in a, b, or c of this provision;
 - 2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a Unit, superintendent, or position of equivalent responsibility (a duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - 3) The written authorization is submitted to the Central Valley Water Board.

- e. Any person signing a document under this Section shall make the following certification:

“I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.”

3. The Discharger shall take all reasonable steps to minimize any adverse impact to the waters of the State resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature, extent, and impact of the noncompliance.
4. The owner of the waste management facility shall have the continuing responsibility to assure protection of waters of the state from discharged wastes and from gases and leachate generated by discharged waste during the active life, closure, and post-closure maintenance period of the waste management units and during subsequent use of the property for other purposes.
5. The fact that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this Order shall not be regarded as a defense for the Discharger’s violations of this Order.
6. The Discharger shall notify the Central Valley Water Board of a material change in; the types, quantity, or concentrations of wastes discharged; site operations and features; or proposed closure procedures, including changes in cost estimates. This notification shall be given a reasonable time before the changes are made or become effective. No changes shall be made without Central Valley Water Board approval following authorization for closure pursuant to the site Notification of Closure [Title 27, § 21710(a)(4)].
7. The Discharger shall maintain legible records of the volume and type of each waste discharged at each waste management unit or portion of a unit, and the manner and location of discharge. Such records shall be maintained by the Discharger until the beginning of the post-closure maintenance period. These records shall be on forms approved by the State Water Board or Central Valley Water Board and shall be maintained at the waste management facility until the beginning of the post-closure maintenance period. These records shall be available for review by representatives of the State Water Board or Central Valley Water Board at any time during normal business hours. At the beginning of the post-closure maintenance period, copies of these records shall be sent to the Central Valley Water Board [Title 27, § 21720(f)].
8. In the event of any change in landowner or the operator of the waste management facility, the Discharger shall notify the succeeding owner or

operator in writing of the existence of this Order. A copy of that notification shall be sent to the Central Valley Water Board.

9. In the event of any change of ownership or responsibility for construction, operation, closure, or post-closure maintenance of the waste discharge facilities described in this Order, the Discharger shall notify the Central Valley Water Board prior to the effective date of the change and shall include a statement by the new Discharger that construction, operation, closure, or post-closure maintenance will be in compliance with this Order and any revisions thereof [Title 27, § 21710(c)(1)].
10. To assume ownership or operation under this Order, the succeeding owner or operator must apply in writing to the Central Valley Water Board requesting transfer of the Order within **14 days** of assuming ownership or operation of this facility. The request must contain the requesting entity's full legal name, the State of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory requirements contained in General Provision K.2 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. Transfer of this Order shall be approved or disapproved by the Central Valley Water Board.

L. STORM WATER PROVISIONS

1. New and existing Class III landfills shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period [Title 27, § 20260(c)].
2. New and existing Class II landfills shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return period [Title 27, § 20250(c)].
3. The Discharger shall design storm water conveyance systems for Class III units for a 100-year, 24-hour storm event, and shall design storm water conveyance systems for Class II units for a 1,000-year, 24-hour storm event [Title 27, § 21750(e)(3)].
4. MSW landfills located in a 100-year floodplain shall demonstrate that the landfill unit will not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health or the environment [40 C.F.R. § 258.11(a)].
5. Waste management units and their respective containment structures shall be designed and constructed to limit, to the greatest extent possible, ponding,

infiltration, inundation, erosion, slope failure, washout, and overtopping under the precipitation conditions for the unit [Title 27, § 20365(a)].

6. Precipitation on landfills or waste piles which is not diverted by covers or drainage control systems shall be collected and managed through the LCRS, which shall be designed and constructed to accommodate the precipitation conditions for each class unit [Title 27, § 20365(b)].
7. Diversion and drainage facilities shall be designed, constructed, and maintained to [Title 27, § 20365(c)]:
 - a. accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the waste management unit:
 - b. effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities;
 - c. prevent surface erosion;
 - d. control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste;
 - e. take into account:
 - i) for closed waste management units and for closed portions of units, the expected final contours of the closed unit, including its planned drainage pattern;
 - ii) for operating portions of waste management units other than surface impoundments, the unit's drainage pattern at any given time;
 - iii) the possible effects of the waste management unit's drainage pattern on and by the regional watershed;
 - iv) the design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed the expected peak flow rate at the point of discharge if there were no waste management facility; and
 - f. preserve the system's function. The Discharger shall periodically remove accumulated sediment from the sedimentation or detention basins as needed to preserve the design capacity of the system.
8. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system [Title 27, § 20365(d)].

9. Surface and subsurface drainage from outside of a waste management unit shall be diverted from the unit [Title 27, § 20365(e)].
10. Cover materials shall be graded to divert precipitation from the waste management unit, to prevent ponding of surface water over wastes, and to resist erosion as a result of precipitation [Title 27, § 20365(f)].
11. Any drainage layer in the final cover shall be designed and constructed to intersect with the final drainage system for the waste management unit in a manner promoting free drainage from all portions of the drainage layer [Title 27, §20365(f)].